

THE AMERICAN PHILOSOPHICAL SOCIETY

HELD AT PHILADELPHIA
FOR PROMOTING USEFUL KNOWLEDGE

YEAR BOOK 1947

JANUARY 1, 1947 – DECEMBER 31, 1947



THE AMERICAN PHILOSOPHICAL SOCIETY
INDEPENDENCE SQUARE
PHILADELPHIA 6

1948

Printed in U.S.A.
George H. Buchanan Co., Philadelphia, Pa.

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A PROPOSAL for Promoting USEFUL KNOWLEDGE among the *British Plantations in America.*

THE *English* are possess'd of a long Tract of Continent, from *Nova Scotia* to *Georgia*, extending North and South thro' different Climates, having different Soils, producing different Plants, Mines and Minerals, and capable of different Improvements, Manufactures, &c.

The first Drudgery of Settling new Colonies, which confines the Attention of People to mere Necessaries, is now pretty well over; and there are many in every Province in Circumstances that set them at Ease, and afford Leisure to cultivate the finer Arts, and improve the common Stock of Knowledge. To such of these who are Men of Speculation, many Hints must from time to time arise, many Observations occur, which if well-examined, puriued and Improved, might produce Discoveries to the Advantage of some or all of the *British* Plantations, or to the Benefit of Mankind in general.

But as from the Extent of the Country, such Persons are widely separated, and seldom can see and converse, or be acquainted with each other, so that many useful Particulars remain uncommunicated, die with the Discoverers, and are lost to Mankind; it is, to remedy this Inconvenience for the future, proposed,

That One Society be formed of Virtuosi or ingenious Men residing in the several Colonies, to be called *The American Philosophical Society* who are to maintain a constant Correspondence.

That *Philadelphia* being the City nearest the Centre of the Continent-Colonies, communicating with all of them northward and southward by Post, and with all the Islands by Sea, and having the Advantage of a good growing Library, be the Centre of the Society.

That at *Philadelphia* there be always at least seven Members, viz. a Physician, a Botanist, a Mathematician, a Chemist, a Mechanician, a Geographer, and a general Natural Philosopher, besides a President, Treasurer and Secretary.

That these Members meet once a Month, or oftner, at their own Expence, to communicate to each other their Observations, Experiments, &c. to receive, read and consider such Letters, Communications, or Queries as shall be sent from distant Members; to direct the Dispersing of Copies of such Communications as are valuable, to other distant Members, in order to procure their Sentiments thereupon, &c.

That the Subjects of the Correspondence be, All new-discovered Plants, Herbs, Trees, Roots, &c. their Virtues, Uses, &c.; Methods of Propagating them, and making such as are useful, but particular to some Plantations, more general, Improvements of vegetable Juices, as Cyders, Wines, &c.; New Methods of Curing or Preventing Diseases. All new-discovered Fossils in different Countries, as Mines, Minerals, Quarries, &c. New and useful Improvements in any Branch of Mathematicks; New Discoveries in Chemistry, such as Improvements in Distillation, Brewing, Assaying of Ores, &c. New Mechanical Inventions for saving Labour; as Mills, Carriages, &c. and for Raising and Conveying of Water, Draining of Meadows, &c.; All
new

new Arts, Trades, Manufactures, &c. that may be proposed or thought of Surveys, Maps and Charts of particular Parts of the Sea-coasts, or Inland Countries; Course and Junction of Rivers and great Roads, Situation of Lakes and Mountains, Nature of the Soil and Productions; &c. New Methods of Improving the Breed of useful Animals; Introducing other Sorts from foreign Countries. New Improvements in Planting, Gardening, Clearing Land, &c.; And all philosophical Experiments that let Light into the Nature of Things, tend to increase the Power of Man over Matter, and multiply the Conveniencies or Pleasures of Life.

That a Correspondence already begun by some intended Members, shall be kept up by this Society with the ROYAL SOCIETY of London, and with the DUBLIN SOCIETY.

That every Member shall have Abstracts sent him Quarterly, of every Thing valuable communicated to the Society's Secretary at *Philadelphia*; free of all Charge except the Yearly Payment hereafter mentioned.

That by Permission of the Postmaster-General, such Communications pass between the Secretary of the Society and the Members, Postage-free.

That, for defraying the Expence of such Experiments as the Society shall judge proper to cause to be made, and other contingent Charges for the common Good, every Member send a Piece of Eight *per Annum* to the Treasurer, at *Philadelphia*, to form a Common Stock, to be disburs'd by Order of the President with the Consent of the Majority of the Members that can conveniently be consulted thereupon, to such Persons and Places where and by whom the Experiments are to be made, and otherwise as there shall be Occasion; of which Disbursements an exact Account shall be kept, and communicated yearly to every Member.

That at the first Meetings of the Members at *Philadelphia*, such Rules be formed for Regulating their Meetings and Transactions for the General Benefit, as shall be convenient and necessary; to be afterwards changed and improv'd as there shall be Occasion, wherein due Regard is to be had to the Advice of distant Members.

That at the End of every Year, Collections be made and printed, of such Experiments, Discoveries, Improvements, &c. as may be thought of publick Advantage. And that every Member have a Copy sent him.

That the Business and Duty of the Secretary be, To receive all Letters intended for the Society, and lay them before the President and Members at their Meetings; to abstract, correct and methodize such Papers, &c. as require it, and as he shall be directed to do by the President, after they have been considered, debated, and digested in the Society; to enter Copies thereof in the Society's Books, and make out Copies for distant Members; to answer their Letters by Direction of the President, and keep Records of all material Transactions of the Society. &c.

Benjamin Franklin, the Writer of this Proposal, offers himself to serve the Society as their Secretary, 'till they shall be provided with one more capable.
Philadelphia, May 14. 1743.

(Courtesy of the Yale University Library from the original in its Benjamin Franklin Collection.)

A BRIEF HISTORY OF THE AMERICAN PHILOSOPHICAL SOCIETY

EDWIN G. CONKLIN

1. FOUNDATION AND ORGANIZATION

The American Philosophical Society is the oldest and one of the most distinguished learned societies in America. It was started by Benjamin Franklin in 1743 in a "Proposal," reproduced on the preceding pages. Some of the principal items of this Proposal are:

That one Society be formed of Virtuosi or ingenious Men residing in the several Colonies, to be called *The American Philosophical Society* who are to maintain a constant Correspondence.

That *Philadelphia* being the City nearest the Centre of the Continent-Colonies . . . be the Centre of the Society.

That at *Philadelphia* there be always at least seven Members, *viz.* a Physician, a Botanist, a Mathematician, a Chemist, a Mechanician, a Geographer, and a general Natural Philosopher, besides a President, Treasurer and Secretary. . . .

That a Correspondence already begun by some intended Members, shall be kept up by this Society with the ROYAL SOCIETY of *London*, and with the DUBLIN SOCIETY. . . .

Benjamin Franklin, the Writer of this Proposal, offers himself to serve the Society as their Secretary, 'till they shall be provided with one more capable.

This Proposal was sent to a carefully selected number of "ingenious men" in Pennsylvania and other Colonies, and about one year later Franklin reported in a letter to a member in New York that "the Society so far as relates to Philadelphia, is actually formed, and has had several Meetings to mutual Satisfaction." He then named seven Philadelphia members, representing the sciences listed in his Proposal, together with the President, Treasurer, and Secretary, and five others from New York and the Jerseys, and then adds: "And there are a number of others in Virginia, Maryland, Carolina and the New England Colonies who we expect to join us as soon as they are acquainted that the Society has begun to form itself."

It is evident that Franklin had in mind an American society more or less like the Royal Society of London, chartered in 1662, in which the members were also characterized as "Virtuosi," and the business and design of which were, in the words of their first Curator, Robert Hooke, "To improve the knowledge of naturall things and all useful Arts, Manufactures, Mechanick practices, Engynes and Inventions by Experiments (not meddling with Divinity, Metaphysics, Moralls, Politicks, Grammar, Rhetorick or Logick)."¹

In Franklin's Proposal the "Subjects of Correspondence" were to be, improvements in the practical arts of agriculture, engineering, trades, and manufactures; all new discoveries in science; "And all philosophical Experiments that let Light into the Nature of Things, tend to increase the Power of Man over Matter, and multiply the Conveniences and Pleasures of Life."

The very subjects that now go under the specific name "philosophy" were generally excluded from the field of the philosophical societies of the seventeenth and eighteenth centuries, and the word "philosophy" was used in its original meaning, love of knowledge, and as the essential equivalent of what is now called "science."

Throughout its long history the Royal Society has retained this restriction of its field to the observational and experimental sciences. The American Philosophical Society followed the same course in its early history; in its Laws, first adopted in 1769, six Committees or Sections were established, viz.:

1. Geography, Mathematics, Natural Philosophy & Astronomy.
2. Medicine and Anatomy.
3. Natural History and Chemistry.
4. Trade and Commerce.
5. Mechanics and Architecture.
6. Husbandry and American Improvements.

A seventh Committee on History, Moral Science, and General Literature, was added to the original six in 1815, thus including what are now called "social sciences" and "humanities." Since 1936 these subjects have been assembled in four classes, viz.:

- I. Mathematical and Physical Sciences
- II. Geological and Biological Sciences
- III. Social Sciences
- IV. Humanities

¹ Weld, C. R., *A History of the Royal Society with Memoirs of the Presidents* I:146, London, 1848.

The business and duties of the Secretary of the Society, as described in the last paragraph of Franklin's Proposal, were heavy and responsible and were essentially like those of Henry Oldenburg, Secretary of the Royal Society in its early years, to whom that society and the world of science owes so much. Franklin offered to assume these duties in the new society, but he was at that time a very active publisher, inventor, and scientific investigator; deputy postmaster, member of the City Council, and leading citizen of Philadelphia and Clerk of the General Assembly. Soon thereafter he was elected a member of the General Assembly of Pennsylvania, and was appointed Deputy Postmaster General of the Continental Colonies, and member of important Continental commissions; from 1757 to 1775 he was almost constantly in Europe, chiefly in London, as Agent of Pennsylvania and later of other Colonies in their relations with the British Government. Consequently these vital duties of the Secretary of the newly-formed Society necessarily devolved upon others less active than himself.

In 1745 Franklin confessed: "The members of our Society here are very idle gentlemen, they will take no pains." And John Bartram, second on the list of members, wrote to a friend, "Franklin, Dr. Bond and I talk of carrying it on with more diligence than ever." But interest in the Society languished. No minutes of meetings of the Society between 1744 and 1768 are now extant and it is probable that the organization was relatively inactive during that period.

Regular minutes of the American Philosophical Society begin on January 19, 1768 with a meeting of three original members of 1743, one elected in 1767, and five chosen on January 12, 1768. They proceeded at once to elect eighteen new members and to invite John Penn, Lieutenant Governor of the Province and grandson of William Penn, to become Patron of the Society, and James Hamilton, former Governor, and Hon. William Allen, Chief Justice of Pennsylvania, to become members. All accepted and thus the Philosophical Society allied itself with the Proprietary Party, and thereafter during that year meetings were held in the State House (the present Independence Hall).

On February 2, 1768 a paper was received proposing the union of the American Philosophical Society with another society known as "The American Society, held at Philadelphia for promoting

and propagating useful Knowledge." This proposal listed the names of twenty-three members, and the American Philosophical Society proceeded at once to elect all of them to its membership. This was regarded as predatory union by the American Society, and it was refused, but Committees of Conference between the two societies were later appointed and a treaty of union was adopted on December 20, 1768.

In the meantime the American Philosophical Society held twelve very active meetings, at the first of which (February 9, 1768) its organization was completed by the election of Hon. James Hamilton as President, Drs. William Shippen and Thomas Bond, Vice Presidents, Philip Syng, Treasurer, and Dr. William Smith, Provost of the College of Philadelphia, Rev. John Ewing, and Dr. Charles Moore, Secretaries. At these meetings, in addition to the election of members, scientific discoveries were announced, inventions were described, and models exhibited; and the Secretaries laid before the Society a project to erect an observatory, obtain instruments, and make preparations to observe the transit of the planet Venus across the disk of the sun on June 3, 1769.

This relatively rare phenomenon had excited great interest throughout the scientific world, since among other things the results of careful observations and calculations would help to determine more accurately the distance of the earth from the sun. The Royal Society sent observers to Fort Prince of Wales on Hudson Bay and to places in Ireland and Norway, and Lieutenant (later Captain) James Cook, with a company of scientists, was sent on H.M.S. *Endeavour* to Otahtiti in the Pacific to observe this transit of June 3, 1769; this was the first of Captain Cook's famous voyages of discovery. The recently revived American Philosophical Society appealed to the House of Assembly of the Province of Pennsylvania for financial assistance in this large undertaking and it was granted £100 sterling to purchase a telescope and micrometer, and was given permission to erect an observatory platform in the State House Yard.

This burst of activity on the part of a society that had been dormant for twenty-four years was stimulated by rivalry with another society, which was the outgrowth of a local club or Junto (whose earliest members are listed as of 1758) which may have

taken its name from the Junto started by Franklin in 1727.² Its membership was limited to twelve and only nine were listed in its minutes as members in 1766. It met weekly for mutual improvement and discussion and was local and social in character, but on December 13, 1766 it enlarged its purposes and membership and took the name of "The American Society for promoting and propagating useful knowledge, held at Philadelphia." Its activity during 1767 served to revive the American Philosophical Society and during that year and 1768 both societies were quite active, although the Philosophical Society, enjoying Proprietary and aristocratic favor, made the better showing, while the American Society, representing the Popular or democratic party, was poor but proud.

On September 23, 1768 the American Society modified its name to "The American Society, held at Philadelphia, for promoting useful Knowledge," and on November 4 of that year Benjamin Franklin was elected its President, although he was then in Europe. At the same time the proposal of union of the two societies was revived and Committees of Conference met and formulated articles of union, "on terms of perfect equality," which were adopted on December 20, 1768. These terms provided, among many other things, that the name of the united society should combine the former names of both, viz.: "The American Philosophical Society, held at Philadelphia, for promoting useful knowledge;" that all members of each society at the end of the year 1768 should become members of the united society; and that its first meeting should be

²In 1914 a Committee of nine distinguished members made an extensive "Report on the Date of the Foundation of the Society" (published in "An Historical Account of the Origin and Formation of the American Philosophical Society," Philadelphia, 1914), and seven of them agreed on adopting 1727, the date of the starting of Franklin's Junto, as the date of the foundation of the Society. This report was accepted by the Society on May 1, 1914 and the date of the Society's seal and stationery was ordered changed from 1743 to 1727. The probable error of this decision (whatever the rule of the Carnegie Foundation for the Advancement of Teaching for determining the date of origin of colleges and universities, upon which it was based) is apparent when it is remembered that the Junto was a local and social club of not more than twelve members, while the American Philosophical Society was to be a continental and international learned society; and its futility is evident for if dated from Franklin's Proposal of 1743 the American Philosophical Society is acknowledged to be thirty-seven years older than the American Academy of Arts and Sciences of Boston, which is the next oldest learned society in America, and even if dated from 1769 the Society is still eleven years older than the Academy. "The priority complex is a sub-species of the inferiority complex."

held on neutral ground, the College [of Philadelphia], on January 2, 1769, at which time officers should be chosen by ballot and Governor John Penn be requested to serve as Patron.

It is evident that both societies, in anticipation of this union, endeavored to have a large and equal number of members. The Philosophical Society listed at that time eight original members of 1743, three who had been elected in 1767 and one hundred and seventeen who were elected at eight meetings in 1768, or a total of one hundred and twenty-eight. The American Society listed two elected in 1758, ten "existing members," time of election unknown, thirteen elected between 1758 and 1768, and one hundred and twenty-four elected at twenty-four different meetings during the year 1768, or a total of one hundred and forty-nine of which number twenty-six were also members of the American Philosophical Society. Thus the total membership of the two societies at the time of the union, excluding duplications, was two hundred and fifty-one.⁸

At the election of officers on January 2, 1769 former Governor James Hamilton, lately President of the Philosophical Society, and Benjamin Franklin, President of the American Society, were candidates for the presidency of the united society and rivalry ran high between the supporters of these two, representing the Proprietary and the Popular parties of the Commonwealth. Although Franklin was at that time, and for several years later, absent in Europe, he was elected President, and thereafter continued to be elected annually until after his death in 1790. Additional officers elected and their membership in the former societies (indicated by "A" for American and "P" for Philosophical) were:

Vice-Presidents, Dr. Thomas Cadwalader A, Dr. Thomas Bond P, Joseph Galloway, Esq. P. Treasurer, Mr. Philip Syng P. Secretaries, Mr. Charles Thomson A, Rev. Dr. William Smith P, Mr. Thomas Mifflin A, Rev. John Ewing P. Curators, Dr. Adam Kuhn P, Dr. John Morgan A, Mr. Lewis Nicola A.

A Council was not established until several years later; on December 17, 1774 "Mr. Biddle proposed to the Society the appoint-

⁸ Of this number 170 were from Pennsylvania, 52 from other Colonies from South Carolina to Massachusetts Bay, and 29 were from foreign lands. Of the latter 9 were from the British West Indies and Nova Scotia, 4 were British officers in the Colonies, 10 were British scientists and physicians, and 7 were from five different countries of Europe.

ment of a Council of twelve persons," but such a Council was not elected until January 5, 1781, at which time twelve Councillors were chosen, four to serve for one year, four for two, and four for three years. Thereafter four Councillors were chosen at each annual election.

The Governor, John Penn, took seriously the defeat of Hamilton in the election and refused to be Patron of the Society, but two years later his successor, Richard Penn, accepted the invitation to be Patron. Since that time, by provision of the Charter (Section III), the Patron has been "his Excellency the President of the Supreme Council [now the Governor] of this Commonwealth." The united society thus began its existence under its present name on January 2, 1769.

The Charter of the Society was not granted by the Commonwealth of Pennsylvania until 1780, after the end of Proprietary government and in the midst of the War for Independence. Certain portions of this Charter are notable for their breadth of view and generous internationalism, applicable then as now. In particular, attention may be called to the third "Whereas" of the preamble:

And Whereas the experience of ages shows that improvements of a public nature are best carried on by societies of liberal and ingenious men, uniting their labours, without regard to nation, sect, or party, in one grand pursuit, alike interesting to all, whereby mutual prejudices are worn off, a humane and philosophical spirit is cherished, and youth are stimulated to a laudable diligence and emulation in the pursuit of wisdom, . . .

Attention is also directed to the final section of the Charter, with the reminder that it was written in the midst of a seven year war when national antagonisms were intense:

And Whereas nations truly civilized (however unhappily at variance on other accounts) will never wage war with the Arts and Sciences, and the common Interests of humanity:

Be it further enacted by the authority aforesaid, That it shall and may be lawful for the said Society by their proper officers, at all times, whether in peace or war, to correspond with learned Societies, as well as individual learned men, of any nation or country, upon matters merely belonging to the business of the said Society, such as the mutual communication of their discoveries and proceedings in Philosophy and Science; the procuring books, apparatus, natural curiosities, and such

other articles and intelligence as are usually exchanged between learned bodies, for furthering their common pursuits; *Provided always*, That such correspondence of the said Society be at all times open to the inspection of the Supreme Executive Council of this Commonwealth.

This Charter is signed by John Bayard, Speaker, and Thomas Paine, Clerk of the General Assembly.⁴

2. MEETINGS AND PUBLICATIONS

Fortnightly meetings were held regularly for more than 175 years, except for an interruption from January 1776 to March 1779 during the American Revolution, during part of which time Philadelphia was occupied by British forces. At these meetings "communications" were presented, either in person or by letter, on a bewildering variety of subjects, for in its early years the Society represented all fields of pure and applied science, and was in addition a museum of natural and archaeological objects, and a kind of patent office for the exhibition and description of inventions such as new forms of plows, machines for mowing with a horse, a model of John Fitch's steamboat which antedated Robert Fulton's by more than twenty-five years, the electrical apparatus of Franklin and Rittenhouse, models of smoke-consuming stoves, etc. Papers were presented on the cultivation of native grapes, the making of wine, the protection of peach trees from blight, and of wheat from the ravages of the Hessian fly, and, one of Franklin's favorite topics, the cure of smoky chimneys. Another enterprise which occupied the attention of the Society for many years and which had the active support of Franklin was the establishment of silk culture and filatures in America. The Society took stock in a Silk Society and lost all of its investment. Large scale projects for the construction of a ship canal between the head waters of Delaware and Chesapeake Bays occupied the attention of the Society for many years, and other projects concerned the improvement of navigation in the Susquehanna and Schuylkill Rivers. Many of these inventions, descriptions and projects were referred to appropriate committees and such as were thought worthy were recommended for publication in the *Pennsylvania Gazette* in order to bring them

⁴ The same Thomas Paine who was author of the stirring call to arms in the pamphlets *Common Sense*, and *The Crisis*, and later author of the defense of revolution in *The Rights of Man*, and of freedom of thought and belief in *The Age of Reason*.

at once to the attention of farmers and industrialists, while papers of more general interest were published in the *American Magazine*.⁵

In 1786 John Hyacinth de Magellan of London gave 200 guineas to the Society to establish a gold medal to be annually awarded, under prescribed terms, to the author of the best discovery or most useful invention relating to navigation, astronomy, or natural philosophy (mere natural history [taxonomy] only excepted). And in 1795 the Society established from its own funds premiums for essays on the following topics:

1. On a system of liberal education and literary instruction adapted to the genius of the government, and best calculated to promote the general welfare of the United States: Comprehending also, a plan for instituting and conducting public schools in this country on principles of the most extensive utility, \$100.
2. The easiest and most expeditious method of computing the longitude from lunar observation, \$70.
3. Improvements on ship's pumps, \$70.
4. For the best construction of stoves or fireplaces, \$60.
5. On preservation of peach trees from premature decay, \$60.
6. On American vegetable dyes [*sic*] \$90.
7. For the best construction or improvement of lamps, especially for lighting streets, \$50.

Again in 1799 it was voted "That a premium of \$100 be offered, with the usual conditions of secrecy, &c., to the author of the best Dissertation upon the following question: How far is it the duty and interest of the Community, to provide for the Education of Youth?" Finally in 1800 the following subjects for premiums were approved:

1. For the most simple, convenient and effective method of ventilating a ship at sea, without manual labor, \$100.
2. For the cheapest and most effectual method of rendering Common Oil fit to be burned in the Argand-lamp, either by purifying the oil, or by improvement in the lamp, \$35.
3. For any simple and effectual method of rendering Turpentine or any other cheap inflammable substance, a fit fuel for street or house lamps, or a proper material for candles, \$40.
4. For the best experimental Essay on the native red dyes [*sic*], of the U. S., accompanied with small specimens of the dyed stuffs, \$150.

⁵ A supplement to the *American Magazine* of 1769 contains "The Transactions of The American Philosophical Society, &c."

As more specialized agencies were established to deal with these applications of science to agriculture and industry, the work of the Society turned more and more to "philosophical experiments that let Light into the Nature of Things" or what is now called "basic research." The leading project of this kind was the transit of Venus on June 3, 1769. Telescopes, clocks, and other instruments were brought, borrowed, or constructed (by David Rittenhouse) and an observatory platform was built in State House Yard and others at Norriton, northwest of Philadelphia, and at Cape Henlopen at the entrance to Delaware Bay. Weather conditions on June 3 were especially favorable and the reports on the observations, and calculations of the results occupy most of the first number of the newly-established *TRANSACTIONS* of the American Philosophical Society, which began publication in the same year, 1769. The first volume, containing articles on additional subjects of philosophical importance, was completed in 1771 and copies were sent to several colleges and universities here and abroad and to a selected list of twenty-three of the "more considerable philosophical societies of Europe," while Franklin, then in England, served as distributing agent by supplying copies to learned individuals and societies not otherwise reached.

The "Advertisement" (Preface) of this volume, after stating that its editors were following the rules of publication adopted by "that illustrious Body, the Royal Society of London, whose example the American Philosophical Society, think it their honor to follow," modestly adds: "And though, in countries where the Arts and all useful Improvements have arrived almost at their maturity, the following work may scarce be considered as a mite thrown into the common treasury; yet here, where they are but in their infancy, it may be received as some accession to our smaller Stock." This volume had been carefully prepared and was "well received by the Royal Society," and drew praise from leading scientists of Europe.

The cost of the observation of the transit and of the publication of this volume of *TRANSACTIONS* had exhausted the funds of the Society and an appeal to the General Assembly was made for financial support. As a result a grant of £250 was made in 1773, and this, together with the grant of £100 in 1768 for a telescope, and the later grant of land in State House Yard as a site for the Society's Hall, was all the financial aid given by the State to this

infant society. Other appeals, at a later time, were made to the Legislature for financial support, but without success.

A second volume of the TRANSACTIONS did not appear until 1786 after the War for Independence, a third in 1793, and a fourth in 1799. Sets of these four volumes were sent to foreign academies and societies, as well as to principal colleges and universities in this and foreign lands, and valuable exchanges of publications were thus early established. A second edition of the first volume was printed in 1789 and some of the volumes were reprinted in Europe. A fifth volume of TRANSACTIONS appeared in 1802 and a sixth in 1809. In 1818 a new series of the TRANSACTIONS, in larger format, was started and this has been continued until at present one volume, consisting of one or more parts, is being issued yearly. The TRANSACTIONS of the American Philosophical Society is the oldest scientific periodical in America, and contains contributions and monographs by leading scholars of this and other lands. It is now employed largely for the publication of the more highly specialized results of research, and particularly for large monographs.

In 1838 the Society established another series, the PROCEEDINGS of the American Philosophical Society; one volume is now being issued each year. This series contains many of the papers and symposia offered at the meetings, as well as contributions from other sources. Until the establishment of the YEAR BOOK in 1937, it also contained the minutes of the business sessions of the Society, obituaries of deceased members, etc. The YEAR BOOK was started not only to record annually the news and activities of the Society and to separate such records from the scientific contributions, but also and chiefly to present reports from the recipients of research grants, and thus to inform the world of what researches are being supported by the Society, and at the same time to impress a sense of responsibility on the part of the recipients of grants. In 1935 another new series of publications was initiated, the MEMOIRS, for scholarly books in all fields of learning. These are issued from time to time in book form.

These publications are rather widely distributed throughout the world to learned societies, scientific institutions, universities, and public libraries, as well as to individuals. They are sent in exchange to such organizations as supply the Society with equivalent publications that are desired for our Library, and are furnished to others at cost.

Stated meetings continued to be held fortnightly until 1902 when a system of Annual General Meetings extending over three days was instituted and the fortnightly meetings were replaced by monthly ones in 1911. Before the advent of these general meetings the only occasion when the scattered members of the Society were brought together were when special celebrations or memorial meetings were held such as the one-hundredth anniversary of the founding of the Society, held in 1843, its sesquicentennial in 1893, the centennial of the Charter in 1880, of the first occupation of the Hall in 1889, and of the death of Franklin in 1890. The greatest of these celebrations was the bicentennial of the birth of Franklin in 1906 which was held in connection with the general meeting in April of that year. Other special celebrations have been held in connection with the general meetings, such as the bicentennial of Franklin's Junto (miscalled the bicentennial of the founding of the Society) in 1927, and the bicentennial of the birth of Jefferson, and of Franklin's "Proposal" in 1943.

The Annual General Meetings at once brought about great improvements. Members came from a distance and programs of papers were given mornings and evenings, with luncheons between programs, and an annual dinner at the close of the meeting. The stated meetings had been reduced from fortnightly to monthly events but often they were poorly attended, in spite of receptions and refreshments, and they were pale events as compared with the general meetings. Finally, in 1936 an Autumn General Meeting of two or three days duration was established, primarily to hear reports from recipients of research grants, and the stated monthly meetings were abandoned. This change from an evening meeting at fortnightly or monthly intervals to general meetings lasting two or three days brought about marked changes in the character of the Society, for at once it increased its national and international significance and decreased its prevailing local nature.

3. MEMBERS AND ELECTIONS

The character of a society of scholars is best indicated by the representation in its membership of leading scientists, scholars, and philosophers regardless of place of residence or nationality, and its reputation is proportional to its wise selectivity in choice of members. This has usually been recognized by the American

Philosophical Society for after the hectic elections of 1768 before the union of the constituent societies, the number of members elected each year was narrowly limited. During the remainder of the eighteenth century the average number elected each year was less than 13 and throughout the nineteenth century slightly more than 17. Omitting the 251 members of the two societies at their union in 1769, the total number of persons elected up to and including 1946 was 3,166, or an average of nearly 20 each year for the 177 years between 1769 and 1946.

By common consent rather than by law, the total number of living members at any one time was always small, although it is not now possible to give that number for particular years, except in a few cases. On October 17, 1834, the Secretaries reported the number of living members

Residing within ten miles of the Hall as.....	110
Residing in the United States beyond that limit	93
Residing in foreign countries.....	98
<hr/>	
Total	301

Before 1902 elections were held four times a year, once in each quarter, and consequently they were largely in the hands of Philadelphia members. With the establishment of Annual General Meetings in that year, elections of officers and members were limited to this one general meeting and at once they assumed greater importance. The laws were amended in 1902 to limit the number of residents of the United States that could be elected in any one year to 15, and of foreign members to 5. In 1918 the total number of members living in the United States was limited by the laws to 400, and of foreign members to 75. The present limit of residents is 500, while the limit on foreign members, although at one time reduced to 60, is now again 75. These limits have now been nearly reached, with the result that members are elected only to replace those who have died, for, since all annual dues and initiation fees were abolished in 1936, membership is wholly honorary and no one ever resigns.

Before the limitations established in 1902 about 30 per cent of all members resided outside the present boundaries of the United States, 40 per cent were from Philadelphia and vicinity, and 30 per cent were from more distant parts of this

country. In the year 1946 about 87 per cent of the members resided within the United States and 13 per cent were foreign. At the same time the resident membership was more widely distributed, about 13 per cent living in the Philadelphia area and 87 per cent in other cities and states.

The present method of nomination and election is intended to insure great care in selection of members. A Committee on Membership in each of the four classes, after receiving proposals from members, submits to all members in that class a list of nominees in the class and calls for a *preliminary ballot* of the class. On the basis of this ballot each committee submits to the whole Society its choices, and the nominations of each class then go to all members of the Society for the *preference ballot*. The results of this ballot are then canvassed by the Council and as a result of the Council's ballot a ticket is prepared to be submitted to the members at the Annual General Meeting; thus new members are elected as a result of three previous and one final ballot.

The roll of early members in this country includes most of the leaders in the formation of our government as well as in philosophy and science. Fifteen members were signers of the Declaration of Independence, including its author, Thomas Jefferson. Eighteen were members of the Constitutional Convention. Thirteen Presidents of the United States have been members of the Society, among them the first four, Washington, Adams, Jefferson, and Madison. Jefferson was for eighteen years (1798-1815) President of the Society, and in accepting the office in the year first named he wrote:

The suffrage of a body which comprehends whatever the American world has of distinction in philosophy and science in general, is the most flattering incident of my life, and that to which I am the most sensible. My satisfaction would be complete were it not for the consciousness that it is far beyond my titles.

It was through Jefferson's initiative that the French botanist André Michaux, a member of the Society, was sent out to explore the plant resources of the interior of this continent. His son, François André Michaux, also a member, bequeathed to the Society a fund for the extension and improvement of agriculture and sylviculture in the United States. It was also by Jefferson's orders while he was President of the United States and also of

the American Philosophical Society that the Lewis and Clark Expedition was sent out to explore the country between the Mississippi and the Pacific. The original manuscript journals of this famous expedition were deposited, by request of Jefferson, in the Library of this Society.

The history of the American Philosophical Society is so closely interwoven with the educational, scientific, cultural, and political history of this nation that it is impossible in a brief review even to touch upon the contributions of the Society and its members to the many developments in all these fields. Suffice it to say that it has played an important part in all of them, and that it has been the mother, or midwife, or at least nurse, of very many of the scientific and cultural societies of America.

4. "PHILOSOPHICAL HALL" AND LIBRARY

The early publications of the Society began to bring to it by way of exchange many volumes from other societies and individuals, as well as specimens of natural history, archaeology, charts, maps, models of instruments and machines, etc. The Society had no place to exhibit or even store these, except in the homes of the librarian and curators. The stated meetings on alternate Fridays were held at the College, the Church Schoolhouse, Carpenter's Hall, or the homes of officers, and it became necessary to provide a home for these activities. The Society petitioned the Assembly for a lot of ground in the State House Square for the purpose of erecting thereon a suitable building and in 1785 this was granted, plans were prepared, subscriptions for the building secured, and the building begun. But the money available was soon expended and building operations suspended while strenuous efforts were made to secure additional funds. Donations came from members near and far among whom Franklin was the chief contributor. He made two gifts of £100 each and finally offered a "loan of what money may be requisite to raise and cover the building upon legal interest"; a bond to Franklin of £500 payable in one year, with legal interest, was authorized by the Society. The building was thus "raised and covered" but not finished within nor furnished, and efforts were made to rent all rooms in the building except the two south rooms on the second floor, which were retained for the Society. Next after Independence Hall, Philosophical Hall is the oldest building on Independence Square.

The Officers and Council met in the new building for the first time on November 13, 1789 and one week later the first regular meeting of the Society was held there. Meetings have been held there regularly ever since except for a few months in the summers of 1793 and 1798 when yellow fever was epidemic in Philadelphia. Until 1932 the basement and first floor of the hall were occupied by tenants, first by the University of Pennsylvania, then by the College of Physicians, Peale's Museum, the artists Charles Willson Peale and Thomas Sully, the Athenaeum, the Agricultural Society, the Municipal Court, and finally by brokers and insurance agents. These rentals and the annual dues of members were for a long time the only regular income of the Society.

In 1814 the City of Philadelphia purchased from the State, Independence Square and all its buildings except the property of the American Philosophical Society, and in 1835 it offered to buy the Society's lot and building, the price to be determined by referees. However the referees were unable to agree on a price and in the financial depression of 1837-1842 that followed, the city withdrew its proposal. While these negotiations were going on and in anticipation of a favorable outcome, the Society had bought property at Ninth and Chestnut Streets and in paying for it had mortgaged practically all its property including its library and scientific and artistic collections. The sheriff levied on these and the Society was near bankruptcy and ruin. Fortunately the members rallied to its support and the Society and its treasures were saved.⁶

For one hundred years the exterior appearance of the hall remained as it was when built, although it underwent many internal changes, but in 1890 a third story was added to the original building to accommodate the library. To strengthen the building for this increased load, iron posts and girders were introduced and the walls, floors, and stairs were rendered as safe and as nearly fire-proof as possible. However, the additional space provided by the third story was quite inadequate for the library which was greatly overcrowded. Furthermore, this third story with its flat roof was out of architectural harmony with the other buildings in the Square and it is generally agreed that it should be removed.

In 1911 the Society again entered into a tentative agreement

⁶ Presidential Address of Frederick Fraley, March 15, 1880. *Proc. Amer. Philos. Soc.* 18: 530-533, 1880.

with the City to exchange at some future time its property on Independence Square for a commodious lot on the Benjamin Franklin Parkway. In 1913 a "Plea" for funds for a new building yielded inadequate results and in 1928 a campaign was started to raise a large sum for a monumental building on this new site. Subscriptions for nearly one million dollars were secured and elaborate plans for the new building were prepared, but the estimated cost of this building was found to be greater than the sum subscribed and in addition it was found difficult to secure clear title to the whole of the lot on the Parkway.

Meanwhile a sentiment of attachment to the historic hall increased among members to such an extent that they finally voted in 1936 to abandon the plans for the building on the Parkway and to remain in the original home of the Society which in nearly one hundred and fifty years had become a shrine of science and learning as Independence Hall was a shrine of patriotism. Subscribers to the new building fund agreed to the transfer of their contributions to general endowment. In 1934 new quarters for the library were rented in the Drexel Building directly opposite the hall on Fifth Street; all leases in the hall were terminated and for the first time in nearly a century and a half the Society occupied the whole of its building.

However it is recognized that this old building is not large enough for the general meetings and the greatly increased activities of the Society, and the rented space in the Drexel Building is not ideal for the safety, satisfactory use, or exhibition of the priceless treasures of the archives and library. Sooner or later an additional building, as near as possible to the old hall, must be built or acquired.⁷

In 1941 the library consisted of more than 100,000 volumes, and nearly 37,000 pamphlets in practically all fields represented by the membership of the Society, but it was not extensively used and there were several other general libraries in Philadelphia. In that year a special committee brought in a report recommending that duplication with other libraries in Philadelphia be avoided as far as possible and that the Society limit its accessions to fields in which its chief collections lay, and especially to the early history

⁷ For a more complete history of the Library of the American Philosophical Society see the article with that title by the Librarian, William E. Lingelbach, in the *William and Mary Quarterly*, ser. 3, 3(1), January 1946.

of science and learning in America, with a view to building up special research collections to a point of superiority rather than the maintenance of a general library. This report was adopted at the general meeting, April 25, 1941, and as a result of this policy, certain holdings, no longer wanted, have been distributed to other libraries where they were needed, while those in the special fields retained are being strengthened.

The Society's archives are especially rich in letters, manuscripts, and documents concerning the early history of the colonies and the development of science and learning in America. Here is the original Charter of Privileges granted by William Penn to the colonists in 1701. Here are many historic manuscripts and letters of the founders of this Government, including the largest collection of Franklin letters and documents to be found anywhere; letters from Washington, Adams, Jefferson; Penn's Cash Book and many of his important papers, including his Commission to the Council of all his powers as Proprietor during his first visit to England in 1684; here is a manuscript volume of the original Laws of Pennsylvania prior to 1700; the original manuscript minutes of the Provincial Council of Pennsylvania; much valuable material relating to the boundary controversy between Penn and Lord Baltimore, including the minutes of the Commissioners to determine the boundary between Pennsylvania and Maryland, the so called Mason and Dixon Line of 1760-1768; a set of Indian Treaties of Pennsylvania and many manuscripts relating to Indian affairs, including several Indian vocabularies prepared by Thomas Jefferson.

The Society once had an important "cabinet" of scientific and historical objects, but with the growth of museums and of special academies and societies most of these objects have been distributed to these more specialized institutions. Among the articles that have been retained are certain memorabilia of Penn, Franklin, Rittenhouse, and Jefferson, such as Penn's theodolite used in surveying the streets of Philadelphia, the electrical apparatus of Franklin and Rittenhouse, the telescope and clock made by Rittenhouse and used in the observation of the transit of Venus in 1769, models of Franklin's and Peale's stoves designed to consume smoke, Franklin's library chair, and the arm chair in which Jefferson wrote the Declaration of Independence, together with a copy in his own

handwriting of that immortal document, as well as an original copy of the first printed broadside of the Declaration, which was read to the people for the first time on July 8, 1776 from the Society's observatory platform in State House Yard.

5. ENDOWMENTS AND RESEARCH

Throughout most of its history the regular income of the Society was derived largely from membership fees and rentals of portions of the Hall; these together with occasional donations and bequests from members and friends for specific purposes kept the Society going, but throughout the eighteenth and nineteenth centuries and well into the twentieth the income was very limited.

The Society now has twenty-four endowment funds which are listed and described each year in the Report of the Treasurer in the YEAR BOOK⁸ and at another place in that report there is a statement of the financial condition of each fund. In general, the name associated with the fund is that of the donor.

Since the recent activity of the Society has depended largely upon the unrestricted funds, brief mention may be made of several of them. The largest fund of the Society is the Penrose Endowment; it represents a bequest of approximately \$3,900,000, one-half of the residuary estate of Dr. Richard A. F. Penrose, Jr., of Philadelphia, who died in 1931. While its income may be used for any of the activities of the Society, it has been wisely determined that its chief use should be for "the increase of knowledge through investigation." The Johnson Endowment is the next most important unrestricted fund. It was established in 1937 when Mr. Eldridge Reeves Johnson removed a previous restriction on a gift of \$500,000 and transferred it to general endowment; as in the case of the Penrose Fund its income is devoted primarily to research.

In addition to the unrestricted funds, the income from two of which is used largely for research, there are two other funds for research in specified fields. The first of these, and one of the earliest founded, is the Michaux Fund established in 1855 by François André Michaux of Paris with a bequest of 92,600 francs for the extension and progress of agriculture and especially silviculture in the United States. In the lack at that time of any organ-

⁸ See p. 215.

ized research program of the Society, the income of this fund was first used for a variety of useful purposes in connection with silviculture, and more recently for the purchase of books on that subject for the Library. Its income is now administered by the Committee on Research.

A second research fund in a specified field is the Daland Fund established by the bequest, of approximately \$220,000, from the residuary estate of Dr. Judson Daland of Philadelphia, who died in 1937. Its income is to be used by the Society for research in clinical medicine.

All the funds of the Society are intended for the promotion of useful knowledge, and in the widest sense this includes the maintenance of the physical property and administration of the Society, its meetings and publications, library and research. But not until 1932 did the Society have any organized program for the support of research. With the receipt in that year of the munificent bequest of Dr. Penrose, a Committee on the Use of Funds for the Advancement of Knowledge through Investigation (later called Committee on Grants, and still later, the Committee on Research) was established, and it has since become one of the most active and important of the standing committees. It receives and passes judgment upon applications for grants-in-aid of research in any field. Each year there is published in the YEAR BOOK a list of the grants awarded during the year and a summary of grants awarded since 1933. All these grants are carefully administered, reports of progress are rendered every year, and when a project is finished or important results are reached a summary is published in the YEAR BOOK; oral reports are often made in the programs of the general meetings.

This support of research has greatly extended the influence of the Society and stimulated all of its activities. More than ever before in the two centuries of its existence the American Philosophical Society is living up to its original name and purpose "for promoting useful knowledge."

II
CHARTER *
STATUTES AT LARGE OF PENNSYLVANIA
CHAPTER DCCCXCIV.

AN ACT

for incorporating the American Philosophical Society held
at Philadelphia for promoting useful knowledge.



Whereas the cultivation of useful knowledge, and the advancement of the liberal arts and sciences in any Country, have the most direct tendency towards the improvement of agriculture, the enlargement of trade, the ease and comfort of life, the ornament of society, and the encrease and happiness of mankind; **And whereas** this country of North America, which the goodness of Providence hath given us to inherit, from the vastness of its extent, the variety of its climate, the fertility of its soil, the yet unexplored treasures of its bowels, the multitude of its rivers, lakes, bays, inlets, and other conveniences of navigation, offers to these United States one of the richest subjects of cultivation, ever presented to any people upon earth; **And whereas** the experience of ages shows that improvements of a public nature, are best carried on by societies of liberal and ingenious men, uniting their labours, without regard to nation, sect or party, in one grand pursuit, alike interesting to all, whereby mutual prejudices are worn off, a humane and philosophical spirit is cherished, and youth are stimulated to a laudable diligence and emulation in the pursuit of wisdom; **And whereas**, upon these principles,

* Original Charter, Granted in 1780. Articles of Amendment added 1935.

divers public-spirited gentlemen of Pennsylvania and other American States did heretofore unite themselves, under certain regulations, into one voluntary Society, by the name of "The American Philosophical Society held at Philadelphia, for promoting useful knowledge," and by their successful labours and investigations, to the great credit of America, have extended their reputation so far, that men of the first eminence in the republic of letters in the most civilized nations of Europe have done honour to their publications, and desired to be enrolled among their members;

And whereas the said Society, after having been long interrupted in their laudable pursuits by the calamities of war, and the distresses of our Country, have found means to revive their design, in hopes of being able to prosecute the same with their former success, and being further encouraged therein by the public, for which purpose they have prayed us, "the Representatives of the Freemen of the Commonwealth of Pennsylvania," that they may be created One Body Politic and Corporate forever, with such powers, privileges, and immunities, as may be necessary for answering the valuable purposes which the said Society had originally in view.

Wherefore, in order to encourage the said Society in the prosecution and advancement of all useful branches of knowledge, for the benefit of their country and mankind.

[SECTION I.] **Be it enacted, and it is hereby enacted by the Representatives of the Freemen of the Commonwealth of Pennsylvania, in General Assembly met, and by the authority of the same, That the Members of the said American Philosophical Society heretofore voluntarily associated for promoting useful knowledge, and such other persons as have been duly elected Members and Officers of the same, agreeably to the fundamental laws and regulations of the said Society, comprized in twelve sections, prefixed to their first volume of transactions, published in Philadelphia by William and Thomas Bradford in the year of our Lord one**

thousand seven hundred and seventy-one, and who shall in all respects conform themselves to the said laws and regulations, and such other laws, regulations and ordinances, as shall hereafter be duly made and enacted by the said Society, according to the tenor hereof, be and forever hereafter shall be, One Body Corporate and Politic in Deed, by the name and style of "The American Philosophical Society held at Philadelphia, for promoting useful knowledge," and by the same name they are hereby constituted and confirmed One Body Corporate and Politic, to have perpetual succession, and by the same name they and their successors are hereby declared and made able and capable in law, to have, hold, receive, and enjoy lands, tenements, rents, franchises, hereditaments, gifts, and bequests of what nature so ever, in fee simple or for term of life, lives, years or otherwise, and also to give, grant, let, sell, alien, or assign the same lands, tenements, hereditaments, goods, chattels, and premises, according to the nature of the respective gifts, grants, and bequests, made to them the said Society, and of their estate therein. **Provided**, that the amount of the clear yearly value of such real estate do not exceed the value of ten thousand bushels of good merchantable wheat.

[SECTION II.] **And be it further enacted by the authority aforesaid**, That the said Society be, and shall be for ever hereafter able and capable in law to sue, and be sued, plead and be impleaded, answer and be answered unto, defend and be defended in all or any of the courts or other places, and before any Judges, Justices, and other person or persons, in all manner of actions, suits, complaints, pleas, causes, and matters, of what nature or kind so ever, within this Commonwealth; and that it shall and may be lawfull to and for the said Society, for ever hereafter to have and use one common seal in their affairs, and the same at their will and pleasure to break, change, alter and renew.

[SECTION III.] **And be it further enacted by the authority aforesaid**, That for the well governing of the said So-

ciety, and ordering their affairs, they shall have the following officers, that is to say, one Patron, who shall be his Excellency the President of the Supreme Executive Council * of this Commonwealth, for the time being, and likewise one President, three Vice Presidents, four Secretaries, three Curators, one Treasurer, together with a Council of twelve members; and that on the first Friday of January next, between the hours of two and five in the afternoon, as many of the members of the said Society as shall have paid up their arrears due to the Society, and shall declare their willingness to conform to the laws, regulations and ordinances of the Society then duly in force, according to the tenor hereof, by subscribing the same, and who shall attend in the Hall or place of meeting of the said Society, within the time aforesaid, shall chuse by ballot, agreeable to the fundamental laws and regulations herein before referred to, one President, three Vice Presidents, four Secretaries, three Curators, and one Treasurer, and at the same time and place, the members met and qualified as aforesaid shall in like manner chuse four members for the Council, to hold their offices for one year, four more members for the Council to hold their offices for two years, and four more members for the Council, to hold their offices for three years. And on the first Friday in January, which shall be in the year of our Lord one thousand seven hundred and eighty-two, and so likewise on the first Friday of January, yearly and every year thereafter, between the hours of two and five in the afternoon, the Members of the said Society met and qualified as aforesaid, shall chuse one President, three Vice Presidents, four Secretaries, three Curators and one Treasurer, to hold their respective offices for one year, and four Council Men to hold their offices for three years, *Provided* that no person residing within the United States shall be capable of being President, Vice President, Secretary, Curator, Treasurer, or member of the Council, or of

* [Now His Excellency the Governor of this Commonwealth.]

electing to any of the said offices, who is not capable of electing and being elected to civil offices within the State in which he resides. *Provided also*, that nothing herein contained shall be considered as intended to exclude any of the said Officers or Councillors, whose times shall be expired, from being re-elected, according to the pleasure of the said Society; and of the day, hours and place of all such elections, due notice shall be given by the Secretaries, or some one of them, in one or more of the public newspapers of this State, agreeable to the said fundamental laws and regulations before referred to.

[SECTION IV.] **And be it further enacted by the authority aforesaid**, That the Officers and Council of the said Society shall be capable of exercising such power for the well governing and ordering the affairs of the Society, and of holding such occasional meetings for that purpose, as shall be described, fixed, and determined by the statutes, laws, regulations and ordinances of the said Society, hereafter to be made. *Provided always*, that no statute, law, regulation or ordinance shall ever be made or passed by the said Society, or be binding upon the members thereof, or any of them, unless the same hath been duly proposed, and fairly drawn up in writing, at one stated meeting of the Society, and enacted or passed at a subsequent meeting at least the space of fourteen days after the former meeting, and upon due notice in some of the public newspapers, that the enacting of statutes and laws, or the making and passing ordinances and regulations, will be part of the business of such meeting; or shall any statute, law, regulation or ordinance be then or at any time enacted or passed, unless thirteen members of the said Society, or such greater number of members as may be afterwards fixed by the rules of the Society, be present, besides such quorum of the Officers and Council, as the laws of the Society for the time being may require, and unless the same be voted by two-thirds of the whole body then present; all which statutes, laws,

ordinances and regulations, so as aforesaid duly made, enacted and passed, shall be binding upon every member of the said Society, and be from time to time inviolably observed, according to the tenor and effect thereof; provided they be not repugnant or contrary to the laws of this Commonwealth, for the time being in force and effect.

And whereas nations truly civilized (however unhappily at variance on other accounts) will never wage war with the Arts and Sciences, and the common Interests of humanity:

[SECTION V.] **Be it further enacted by the authority aforesaid,** That it shall and may be lawful for the said Society by their proper officers, at all times, whether in peace or war, to correspond with learned Societies, as well as individual learned men, of any nation or country, upon matters merely belonging to the business of the said Society, such as the mutual communication of their discoveries and proceedings in Philosophy and Science; the procuring books, apparatus, natural curiosities, and such other articles and intelligence as are usually exchanged between learned bodies, for furthering their common pursuits; **Provided** always, That such correspondence of the said Society be at all times open to the inspection of the Supreme Executive Council of this Commonwealth.

[Signed]

JOHN BAYARD,
Speaker.

Enacted into a Law at Philadelphia on Wednesday the fifteenth day of March anno Domini one thousand seven hundred and eighty.

[Signed]

THOMAS PAINE,
Clerk of the General Assembly.

COMMISSION FOR THE COMPILATION OF THE LAWS
OF PENNSYLVANIA PRIOR TO 1800.

CLERK'S OFFICE,
1211 BETZ BUILDING.

JAMES T. MITCHELL,
HENRY FLANDERS, } *Commissioners.*

CHAS. R. HILDEBURN, *Clerk.*

PHILADELPHIA, March 12, 1898.

Compared, revised and found to be a correct copy of the original enrollment in the archives of the Commonwealth, by me the custodian of the said original as clerk of the commissioners appointed under the act of May 19, 1887, entitled, AN ACT FOR THE COMPILATION AND PUBLICATION OF THE LAWS OF THE PROVINCE AND COMMONWEALTH OF PENNSYLVANIA PRIOR TO THE YEAR ONE THOUSAND EIGHT HUNDRED, P.L. 1887, pp. 129 and 130.

CHAS. R. HILDEBURN,
Clerk of the Commissioners.

Witness as to Chas. R. Hildeburn:

WM. NEWBOLD ELY,
JULIUS F. SACHSE.



Sworn to and subscribed before me
this 19th day of May, 1898.

JAMES P. STERRETT,
*Chief Justice of the Supreme Court
of Pennsylvania.*

ARTICLES OF AMENDMENT

ARTICLE I

Notwithstanding the Proviso at the end of the first paragraph following the preamble of this Charter, or any other proviso thereof, the Society shall have the capacity and authority without limitation by this Charter to purchase, take, receive, lease as lessee, take by gift, devise or bequest, or otherwise acquire, and to own, hold, use, and otherwise deal with any and all real or personal property, or any interest therein, wherever situated.

ARTICLE II

Any provisions of this Charter which are purely administrative in their nature, including those concerning the officers, the members of the council, and the date and time of meetings, may be altered by a law, regulation or ordinance of the Society duly adopted and not repugnant or contrary to the laws of this Commonwealth.

CERTIFICATE OF ACCEPTANCE

1. The name of the accepting corporation is The American Philosophical Society held at Philadelphia for promoting useful knowledge.

2. The American Philosophical Society was created by the Act of Assembly approved March 15, 1780, L.B. No. 1, 363.

3. The American Philosophical Society herewith accepts the Constitution of Pennsylvania and the provisions of the Nonprofit Corporation Law.

4. The acceptance made herewith was duly authorized by a meeting of the members called for that purpose, held in Philadelphia on the 6th day of December, 1935.

ROLAND S. MORRIS
President

C. F. SKINKER
Assistant Secretary



Filed this 12th day of
December, 1935

J. WARREN MICKLE

Deputy Secretary of the Commonwealth

Recorded in

Miscellaneous Corporation

Record Book 210, P. 125

III

LAWS

(As Amended April 24, 1936, April 22, November 19, 1938,
November 18, 1939, November 21, 1942,
April 23, 1943, and October 19, 1946)

CHAPTER I

Of the Members both resident and foreign: their classification, nomination, and election; suspension and forfeiture of membership.

ART. 1. The resident members of the Society are elected from among citizens or residents of the United States who have achieved distinction in the sciences or humanities, in letters, in the practice of the arts or of the learned professions, or in the administration of affairs. Their number may not exceed five hundred, nor may more than thirty be elected in any one year.

ART. 2. The foreign members of the Society are elected from among persons who are neither citizens nor residents of the United States, and who are of the greatest eminence for their attainments in science, letters, or the liberal arts. Their number may not exceed seventy-five, nor may more than eight be elected in any one year.

ART. 3. Every member, whether resident or foreign, shall be classified according to his expressed wishes, or in accordance with his principal activities or contributions to knowledge, in one of the following four classes:*

* In accordance with general usage, the following more or less clearly defined fields of science and learning within the four classes have been recognized by the Society in recent years: Class I. Mathematics; Astronomy; Physics; Chemistry; Engineering. Class II. Geology, Paleontology, Geography; Zoology, Anatomy; Botany, Bacteriology; Anthropology, Psychology; Physiology, Pathology; Medicine, Pharmacology, Surgery. Class III. Political Science, Economics, Statistics and Sociology; Modern History; Jurisprudence; Administration, Government; Affairs. Class IV: Philosophy, Education; Ancient, Medieval, and Cultural History; Archaeology, History of Art, Architecture; Literary History; Languages; Letters, Fine Arts.

- Class I. Mathematical and Physical Sciences
- Class II. Geological and Biological Sciences
- Class III. Social Sciences
- Class IV. Humanities

ART. 4. In each of the four classes of members there shall be a Committee on Membership consisting of a Chairman and four other members, appointed by the President.

ART. 5. Nominations to membership shall be made in writing by the Committees on Membership, or they may be made by any five members of the Society. These nominations shall be known respectively as "Committee nominees," and "Member nominees," and shall be so listed in the *preliminary ballot*. These nominations must be in the Executive Office before December first. Nominations shall be on blank forms provided for that purpose and shall specify the qualifications and principal activities or fields of learning of the nominees. In case of non-election nominations may be continued by the written endorsement of three of the proposers filed in the Executive Office before November first following and shall be listed as "Continued nominations" in the *preliminary ballot*; these nominations may be continued a second time in similar manner, after which the names of the unsuccessful candidates will be dropped and all papers relating thereto destroyed. Such candidates may be considered again only by entirely new nominations.

ART. 6. Immediately after December first in each year the Chairman of each Committee on Membership shall submit to the members of his class a list of all the nominations in the class and shall request them to use this list as a *preliminary ballot* and to check on it the names of those persons, not more than twelve in number, whom they prefer for resident members, and not more than five whom they prefer for foreign members, and to sign and return this ballot to the Executive Office before January first.

ART. 7. Before February first each Committee on Membership shall select from among those nominees having a

high number of votes in the *preliminary ballot* not more than twelve for resident membership and not more than five for foreign membership in each class, due regard being given to a proper representation of the various subjects within the class.

ART. 8. Before February first, the Council may nominate not more than three persons in each year whose names shall be presented to the Society in the *preference ballot* as "Council nominees" together with their qualifications. These nominations shall be on the regular blank forms provided for that purpose.

ART. 9. It shall be the duty of each Committee on Membership to prepare, with such outside assistance as it may choose, a brief biographical sketch of each of the nominees so selected, listing his profession, position, qualifications, and important publications or contributions to science, literature, art or affairs. The names of these nominees, together with the biographical sketch of each, shall then be printed in alphabetical order under each class, and shall be sent confidentially to all members of the Society not later than March first. Members shall be invited to return to the Executive Office before April first a *preference ballot* on which they have checked the names of not more than thirty nominees for resident membership and of not more than eight for foreign membership.

ART. 10. The Council at the meeting next preceding the General Meeting of the Society in the month of April, notice of which shall be given at least two weeks in advance, shall select by ballot from the list of nominees residing within the United States a number not exceeding thirty, and of non-residents of the United States a number not exceeding eight, to be recommended to the Society for election. In this selection special weight shall be given to the votes of members in the preference ballot. The names of the nominees so chosen, arranged alphabetically in classes, shall be reported to the Society at its next ensuing session.

ART. 11. Election to membership, both resident and foreign, shall be by ballot at the General Meeting of the Society in the month of April. A two-thirds vote of those present and voting shall be necessary to elect.

ART. 12. The members are mutually pledged not to mention to non-members of the Society the name of any nominee proposed, or of any withdrawn or unsuccessful nominee.

ART. 13. Every person who is elected a resident or foreign member shall signify his acceptance in writing within one year after the mailing of notification of such election. In default of such acceptance the election shall be void.

ART. 14. The formal admission of a member into the Society shall be at his first attendance at a meeting of the Society after his election and in the manner and form following: He shall subscribe the Laws in the Roll Book and be introduced to the President, who, taking him by the hand, shall say:

“By the authority and in the name of the American Philosophical Society held at Philadelphia for Promoting Useful Knowledge, I do admit you a Member thereof.”

ART. 15. The Society may from time to time assess membership dues in accordance with its needs and policies. Any person who shall refuse or neglect to pay such assessment for two years, after two or more notifications from the Treasurer, shall be reported to the Society as delinquent and his name shall be stricken from the roll of members.

ART. 16. The membership of any resident or foreign member may, for good and sufficient cause, and upon recommendation by the Council, be terminated by the Society at a General Meeting by a vote of two-thirds of the members attending, provided, however, that the total number of members so attending shall be not less than thirty.

CHAPTER II

Of the Patron and Elective Officers; qualifications, nominations and elections, terms of office, suspension or removal, vacancies.

ART. 1. The Governor of Pennsylvania shall be ex-officio the Patron of the Society.

ART. 2. The elective Officers of the Society shall be a President, three Vice-presidents, two Secretaries, a Curator, a Treasurer, and twelve Councillors.

ART. 3. No person save the Treasurer, who may be a Corporation, shall be capable of holding any elective office as defined above, who is not a citizen of the United States.

ART. 4. Nominations to the elective offices of the Society are made by the Committee on Nominations as hereinafter provided, and may also be made by petition signed by not less than twenty members, in such manner as may be prescribed by the Committee on Nominations and approved by the Council.

ART. 5. The election of Officers shall be held at the General Meeting in the month of April at a time duly announced in the program. The election shall be by ballot, a majority of all ballots cast being requisite for election. In the event that no candidate for a given office shall receive such a majority, a second ballot shall be taken and election shall be by plurality of votes cast.

ART. 6. The terms of all elective Officers, except Councillors, are of one year, commencing upon the close of the General Meeting at which they are elected. They shall serve until the election and acceptance of their successors and are eligible for reelection.

ART. 7. The terms of Councillors are of three years, commencing upon the close of the General Meeting at which they are elected. They shall serve until the election and acceptance of their successors, but are ineligible for reelection until one year after the expiration of their terms of office.

ART. 8. Any elective Officer may be suspended or removed from office, for good and sufficient cause, at a meeting of the Council, by a vote of two-thirds of all its members.

ART. 9. A vacancy occurring in any elective office may be filled for the unexpired term by a vote of a majority of the Council.

CHAPTER III

Of the Officers and their duties

ART. 1. The PRESIDENT shall preside at the meetings of the Society and Council; he shall appoint all committees, and designate their chairmen, except as otherwise provided in the Laws, and shall be ex-officio a member of all committees except the Committee on Nominations.

ART. 2. The VICE-PRESIDENTS shall preside at meetings of the Society and Council, in the absence of the President, in rotation in order of seniority of continuous service. In the event of the death or disability of the President, the senior Vice-president shall act as President until the vacancy shall be filled.

ART. 3. The SECRETARIES shall have the custody of the Seal of the Society, shall record the proceedings of the Society and the Council, shall notify all acts of the Society and the Council to those concerned, shall conduct the correspondence of the Society and Council, shall maintain the authentic list of resident and foreign members, and shall have the custody of the Society's files and records. The Secretaries shall arrange among themselves each year as to the distribution and performance of their duties, and shall report such arrangement to the Council; they shall also have power to delegate the performance of their duties to the Assistant Secretary or Executive Officer.

ART. 4. The CURATOR shall have charge of the Cabinet, and shall supervise the maintenance, exhibit, and use of the Society's collections, and shall advise the Council with respect to their increase, disposal, or temporary loan. He shall be ex-officio a member of the Committee on the Hall.

ART. 5. The TREASURER may be a person, as defined in Chap. II, Art. 3, or a trust company or other suitable financial corporation of the State of Pennsylvania. He shall collect and receive all moneys due or payable to the Society or entrusted to its care, and all gifts and bequests made to it. He shall pay all bills due by the Society when properly approved, in accordance with appropriations authorized by the Society or the Council, or in accordance with the terms of trust funds established for specific purposes. He shall deposit the funds and securities of the Society in its name with such banks or trust companies in the State of Pennsylvania as may be approved by the Committee on Finance.

ART. 6. The Treasurer shall keep accounts in good and regular order of all receipts and expenditures and of all moneys or other property in his hands, and shall report them, and present them for audit, as may be required by the Committee on Finance.

ART. 7. The Treasurer may, if authorized by vote of the Committee on Finance, employ an assistant treasurer or a trust company or other suitable financial corporation of the State of Pennsylvania, approved by the Committee on Finance, for the performance of such duties as may be delegated to such agent.

ART. 8. The Treasurer shall give bond, at the expense of the Society, for the faithful execution of all his trusts, in such amount as may be required by the Committee on Finance.

ART. 9. The Treasurer shall, upon the expiration of his term of office, deliver over to the Committee on Finance, for transmittal to his successor, the books, papers, moneys, and property remaining in his hands.

ART. 10. No elective office in the Society except that of Treasurer shall carry any salary, but officers may be reimbursed for any necessary expenditures made in the performance of their duties.

CHAPTER IV

Of the Council and the Annual Budget

ART. 1. The COUNCIL shall consist of the Officers, the twelve Councillors, and the Chairmen of the Committees on Finance, Research, Publications, Library and Hall.

ART. 2. The Council shall hold at least two meetings a year, and nine members shall constitute a quorum at any meeting, provided, however, that for the adoption of the budget a vote of a majority of all the members shall be requisite. Minutes of the proceedings and acts of the Council shall be regularly kept.

ART. 3. The Council shall make recommendations for membership in the Society as provided in Chap. I, Art. 9, of the Laws, and elect members of the Committees on Research and Publications as provided in Chap. 5, Arts. 5 and 8.

ART. 4. The Council shall, at such time as they may fix, ask all Committees to submit estimates of their needs for the ensuing fiscal year which, together with the report of receipts and expenditures by the Committee on Finance, shall be made the basis for the annual budget to be submitted by the Council to the Society for its approval at the General Meeting in April or November.

ART. 5. The Council shall have power to take action for the Society in legal matters, to manage its affairs, and to assume its administration, to make contracts or to authorize them to be made in the name of the Society, except as otherwise provided.

ART. 6. The Council shall require reports to be presented to it at least once a year by such officers, committees, and employees of the Society as they may designate, or as may be required by the Laws to present such reports, and shall, through the President, present an annual report to the Society on the state of its affairs.

ART. 7. The Council shall have power to appoint an administrative Executive Officer, and to fix his term of service, duties and compensation.

CHAPTER V

Of the Committees of the Society

ART. 1. There shall be four COMMITTEES ON MEMBERSHIP, one in each class, each composed of five members whose appointment and duties are prescribed in Chap. I, Arts. 4-8.

ART. 2. There shall be a COMMITTEE ON FINANCE, consisting of the President and Treasurer, ex-officio, and not fewer than five other members who shall be nominated by the President and elected by the Society at the General Meeting in April. A majority of the Committee shall constitute a quorum at any meeting. The Committee shall keep a record of all its acts and proceedings, which shall be communicated to the Council.

ART. 3. The Committee on Finance shall have the general superintendence of the financial concerns of the Society. It shall have the custody and control of all the securities and investments of the Society, both real and personal, with full power and authority to buy and to sell, and to invest and reinvest the same; including the power to purchase and to sell real estate and to make leases thereof, to satisfy mortgages and extinguish ground rents, and to direct the placing of all such insurances as it may deem necessary; as well as to borrow on the credit of the assets of the Society, to create mortgages thereon, and to make such improvements, repairs and alterations to real estate as it may deem necessary. It shall have power to authorize the proper Officers of the Society to execute the necessary papers to effect all purchases, sales and assignments of property, both real and personal; to execute and to satisfy mortgages, to extinguish ground rents and to transfer registered securities; to subscribe to bond-holders' agreements to plans of reorganization involving any securities held by the Society or in which it has an interest, and to do all such acts as are necessary in pursuance of the foregoing powers.

ART. 4. The Committee on Finance shall always have access to the Treasurer's books, accounts, and vouchers,

and shall cause an audit of such accounts to be made at least once a year. It shall require from the Treasurer an annual report of all the operations of the treasury, which it shall present to the Council with an annual statement of estimates of receipts and expenditures. With the approval of the Council it shall determine the fiscal year of the Society and, in case of emergency needs, authorize appropriations over and above the annual budget.

ART. 5. There shall be a COMMITTEE ON RESEARCH, consisting of the President, ex-officio, and of not fewer than six other members, representative of the four classes, who shall serve for three years and who shall be nominated by the President and elected by the Council. A majority of the Committee shall constitute a quorum at any meeting, and shall be requisite for any vote disposing of funds that may be allotted to the Committee. The Chairman, or a member designated by the Chairman, of the Committee on Publications, and of the Committee on Meetings, may sit with the Committee on Research but shall not vote.

ART. 6. The Committee on Research shall, with the approval of the Council, prescribe regulations for receiving and considering proposals for the advancement of knowledge through investigation. It may take such action as it shall see fit with respect to proposals received by it, and may, with the approval of the Council, itself initiate and cause to be executed investigations for the advancement of knowledge. It shall certify to the Treasurer all disbursements to be made from funds appropriated to it by the Council, and may allot therefrom such sums as it may see fit, on such conditions as it may prescribe, for the investigations approved by it. It shall require reports of the expenditures of all sums so allotted, and of the progress of all investigations aided thereby. It may withhold assistance in the event that the said reports are judged unsatisfactory.

ART. 7. The Committee on Research shall report all its acts to the Council, and from time to time submit reports

to the Society on the progress of the investigations aided by it, and on the contributions to the advancement of knowledge made by them.

ART. 8. There shall be a COMMITTEE ON PUBLICATIONS, consisting of the President, ex-officio, and of not fewer than six other members, representative of the four classes, who shall serve for three years, and who shall be nominated by the President and elected by the Council. A majority of the Committee shall constitute a quorum at any meeting, and shall be requisite for any vote disposing of funds that may be allotted to the Committee. The Chairman, or a member designated by the Chairman, of the Committee on Research and of the Committee on Meetings, may sit with the Committee on Publications but shall not vote.

ART. 9. The Committee on Publications shall supervise the contents, editing, printing, publications, distribution, and sale of all publications issued by the Society or in its name. It shall have power to employ necessary editorial assistance, and, with the approval of the Council, to appoint an Editor and to determine his duties and fix his compensation. It shall cause the necessary contracts for the manufacture of the Society's publications to be drawn up and executed. It shall certify to the Treasurer all bills which it shall have examined and approved for expenses attending the publications, as well as all disbursements to be made from funds appropriated to the Committee by the Council.

ART. 10. The Committee on Publications shall, with the approval of the Council, prescribe regulations for receiving and considering proposals for publication, and may take such action as it shall see fit with respect to proposals so received, including the allotment of funds appropriated to the Committee by the Council. The Committee shall have power to appoint referees or special sub-committees to assist it in the examination of material presented to it for publication and, in its discretion, give honoraria for services so rendered. It shall report all its acts to the Council.

ART. 11. There shall be a COMMITTEE ON MEETINGS, consisting of the President, ex-officio, and of not fewer than four other members representative of the four classes. The Committee shall be appointed by the President and shall have power to add to its numbers. A majority of the Committee shall constitute a quorum at any meeting and shall be requisite for any vote disposing of funds that may be allotted to the Committee. The Chairman, or a member designated by the Chairman, of the Committee on Research and of the Committee on Publications, may sit with the Committee on Meetings but shall not vote.

ART. 12. The Committee on Meetings shall be charged with the preparation of the scientific and scholarly programs of all meetings of the Society, and of all meetings held under its auspices, and with the organization of discussions, symposia, and conferences. It shall have power to name special sub-committees to assist it, and to invite suitable persons, whether members of the Society or not, to participate in such programs, discussions, symposia, etc. The Committee shall have power to use such funds as may be appropriated to it by the Council for defraying the expenses of the programs, discussions, etc., organized by it, and shall certify to the Treasurer all disbursements to be made from such funds.

ART. 13. The Committee on Meetings shall transmit to the Committee on Publications all papers, communications, reports, and other materials which it may recommend for publication.

ART. 14. There shall be a COMMITTEE ON LIBRARY, consisting of the President, ex-officio, and of not fewer than six other members, representative of the four classes, who shall serve for three years and who shall be appointed by the President.

ART. 15. The Committee on Library shall supervise the administration of the Library, and shall, with the approval of the Council, prescribe regulations for its government and use. The Committee shall have power, with the ap-

proval of the Council, to employ a Librarian, determine his duties, and fix his compensation. It shall have charge of the exchange of publications, and shall have power to expend income of trust funds established specifically for purposes of the Library. The Committee shall prepare estimates of expenditures for the maintenance and increase of the Library, and shall certify to the Treasurer all bills properly payable and all disbursements to be made from funds appropriated by the Council for the purposes of the Library.

ART. 16. There shall be a COMMITTEE ON HALL, consisting of the President and Curator, ex-officio, and such other members as may be appointed by the President. They shall serve for three years and shall have charge of the Hall of the Society and of its furniture and fixtures and shall direct all necessary repairs.

ART. 17. There shall be a COMMITTEE ON NOMINATION OF OFFICERS consisting of five members,—a Chairman, appointed by the President, and the four Councillors who are entering the third year of their term of service.

ART. 18. The Committee shall, not later than December first, invite all members of the Society to submit to it informal suggestions for nominations to all offices to be filled by election at the next General Meeting.

ART. 19. The Committee shall then communicate to all members of the Society, not later than March first, a report presenting one nomination to each office to be filled by election at the next General Meeting. Nominations may also be made by petition if signed by twenty or more members and submitted to the Chairman not later than March thirty-first. Notice of such nomination must be sent to all members by April first.

ART. 20. The Committee shall prepare for use in the elections at the General Meeting a ballot in which shall be included, under each position to be filled by election, the name of the Committee's nominee, and the names, in alphabetical order, of any nominees included in petitions duly received in accordance with the Laws.

CHAPTER VI

On the Meetings of the Society

ART. 1. The Annual General Meeting shall be held in the month of April on days designated by vote of the Council, adopted at least three months before the date fixed therefor, at which it shall be lawful to transact all business not in contravention of the Laws.

ART. 2. The Autumn General Meeting shall be held on days designated by vote of the Council, usually in the month of November, at which it shall be lawful to transact all business not in contravention of the Laws.

ART. 3. Special meetings may be called at any time by order of the President, or, in his absence or disability, by order of a Vice-president, or by vote of the Council, for the consideration of matters of scientific or scholarly interest or for the transaction of such business as shall be specified in the order or vote calling the meeting.

CHAPTER VII

Of the Publications of the Society

ART. 1. The publications of the Society shall consist of PROCEEDINGS, TRANSACTIONS, MEMOIRS, YEAR BOOK, and of such other serial or separate publications as may be authorized by the Council upon recommendation by the Committee on Publications.

ART. 2. The PROCEEDINGS shall contain papers that are read before the Society at its meetings and that have been approved by the Committee on Publications. Other papers from whatever source may also be published in the PROCEEDINGS if approved by this Committee. THE PROCEEDINGS will be distributed without charge, as issued, to the members who request it.

ART. 3. The TRANSACTIONS shall consist of contributions in the form of monographs, treatises, collections of documents, and other materials, approved by the Committee on Publications. The TRANSACTIONS shall be issued in complete parts, one or more of which may constitute a volume.

They may be supplied to any member on such conditions or terms as may be prescribed by the Committee on Publications.

ART. 4. The MEMOIRS shall consist of works approved by the Committee on Publications. They shall be issued in such form as shall make possible their assembly in volumes according to subject matter, or to fields of knowledge. They may be supplied to any member on such conditions or terms as may be prescribed by the Committee on Publications.

ART. 5. The YEAR BOOK shall contain, among other items, the Charter and Laws, list of Officers and Committees, the annual report of the President and Officers, important acts of the Society and Council, reports of all standing Committees, a catalogue of prizes, premiums and lectureships, lists of all members together with those elected and those deceased during the year, and obituaries of deceased members. It shall be published as soon as possible after the close of each calendar year and shall be sent gratis to all members of the Society.

CHAPTER VIII

Of the Laws of the Society and their Amendment

ART. 1. No amendment or supplement to these laws, nor any new law shall be made or passed by the Society, unless the same has been duly proposed in writing at a Stated Meeting of the Society and enacted at the subsequent General Meeting; due notice of the proposed law or amendment having been sent by mail at least fourteen days before the said General Meeting to the members qualified to vote thereon.

ART. 2. At the General Meeting no amendment or supplement to these laws shall be made, nor shall any new law be made, unless there be present a quorum of at least twenty members, of whom not fewer than five shall be members of the Council, and the same be voted by two-thirds of the whole body present.

IV
OFFICERS AND COMMITTEES
1947-1948

OFFICERS

PATRON

THE GOVERNOR OF PENNSYLVANIA

PRESIDENT

THOMAS S. GATES

VICE-PRESIDENTS

ALFRED N. RICHARDS ROSS G. HARRISON ST. GEORGE L. SIOUSSAT

SECRETARIES

ERNEST M. PATTERSON JACOB R. SCHRAMM

CURATOR

FRANCIS R. PACKARD

TREASURER

FIDELITY-PHILADELPHIA TRUST COMPANY

EXECUTIVE OFFICER

LUTHER P. EISENHART

LIBRARIAN

WILLIAM E. LINGELBACH

COUNCILLORS

Elected in 1945	Elected in 1946	Elected in 1947
KARL K. DARROW	WENDELL M. STANLEY	JOEL STEBBINS
EDWIN G. CONKLIN	GEORGE G. SIMPSON	EDMUND W. SINNOTT
NICHOLAS KELLEY	HERBERT F. GOODRICH	EDWIN B. WILSON
CARL W. BLEGEN	WALDO G. LELAND	HOWARD M. JONES

STANDING COMMITTEES

The President is *ex-officio* a member of all committees except the Committee on Nomination of Officers. The first member named in each committee is Chairman. The Executive Officer sits with all committees but does not vote unless regularly a member.

FINANCE

(1946-1947)

MARSHALL S. MORGAN
OLIVER E. BUCKLEY
EDWIN G. CONKLIN
MORRIS DUANE
EDWARD HOPKINSON, JR.
NICHOLAS KELLEY
CHARLES J. RHOADS
J. HENRY SCATTERGOOD

RESEARCH

LUTHER P. EISENHART (1945-48)
WILLIAM F. ALBRIGHT (1945-48)
DETLEV W. BRONK (1945-48)
LEONARD CARMICHAEL (1947-50)
GILBERT CHINARD (1947-50)
EDWIN G. CONKLIN (1945-48)
FRANK A. FETTER (1945-47)
CARTER GOODRICH (1947-48)
WILLIAM J. ROBBINS (1946-49)
HARLOW SHAPLEY (1945-48)
RICHARD H. SHRYOCK (1947-50)
W. F. G. SWANN (1947-50)
HUGH S. TAYLOR (1945-48)
DONALD R. YOUNG (1946-49)

MEETINGS

(1946-1947)

LUTHER P. EISENHART
EDWIN G. CONKLIN
GEORGE W. CORNER
KARL K. DARROW
WALDO G. LELAND
ROY F. NICHOLS
ERNEST M. PATTERSON
BERNADOTTE E. SCHMITT
JOSEPH H. WILLITS

HALL

FRANCIS R. PACKARD (1946-49)
EDWIN G. CONKLIN (1946-49)
EDWARD HOPKINSON, JR. (1945-48)
FISKE KIMBALL (1946-49)
EDWIN O. LEWIS (1946-49)
WILLIAM E. LINGELBACH (1945-48)
MARSHALL S. MORGAN (1945-48)
LAWRENCE J. MORRIS (1945-48)
THOMAS J. WERTENBAKER (1945-48)

PUBLICATIONS

JACOB R. SCHRAMM (1947-50)
WILLIAM B. DINSMOOR (1947-50)
LUTHER P. EISENHART (1945-48)
HENRY C. LANCASTER (1946-49)
WILLIAM E. LINGELBACH (1945-48)
ERNEST M. PATTERSON (1945-48)
ADOLPH H. SCHULTZ (1945-48)
ROBERT L. SCHUYLER (1946-49)
GEORGE G. SIMPSON (1947-50)
HUGH S. TAYLOR (1945-48)

LIBRARY

WILLIAM E. LINGELBACH (1945-48)
JULIAN P. BOYD (1946-49)
GILBERT CHINARD (1946-49)
GEORGE W. CORNER (1946-48)
KARL K. DARROW (1946-48)
WALDO G. LELAND (1946-49)
HARRY M. LYDENBERG (1947-50)
J. PERCY MOORE (1946-49)
A. S. W. ROSENBACH (1947-50)
RICHARD H. SHRYOCK (1945-48)
ST. GEORGE L. SIOUSSAT (1945-48)
CARL VAN DOREN (1946-49)

OFFICERS AND COMMITTEES

COMMITTEES ON MEMBERSHIP

(1947-1948)

CLASS I. MATHEMATICAL
AND PHYSICAL SCIENCES

OLIVER E. BUCKLEY
 ROGER ADAMS
 SOLOMON LEFSCHETZ
 JOEL STEBBINS
 HARALD M. WESTERGAARD

CLASS II. GEOLOGICAL AND
BIOLOGICAL SCIENCES

WALTER S. HUNTER
 †ROLLIN T. CHAMBERLIN
 L. C. DUNN
 A. BAIRD HASTINGS
 EDMUND W. SINNOTT

CLASS III. SOCIAL SCIENCES

EDWIN B. WILSON
 OWEN LATTIMORE
 HENRY A. MOE
 ROBERT L. SCHUYLER
 JACOB VINER

CLASS IV. HUMANITIES

WILLIAM F. ALBRIGHT
 FRANK AYDELOTTE
 HENRY C. LANCASTER
 CHARLES G. OSGOOD
 WILLIAM L. WESTERMANN

COMMITTEE ON NOMINATION OF OFFICERS

(1947-1948)

WILLIAM B. DINSMOOR, Chairman

KARL K. DARROW	} Retiring Councillors
EDWIN G. CONKLIN	
NICHOLAS KELLEY	
CARL W. BLEGEN	

SPECIAL COMMITTEES

The first named in each committee is Chairman

AMERICAN LINGUISTICS AND ARCHAEOLOGY

	ALFRED V. KIDDER
LEONARD BLOOMFIELD	WILLIAM E. LINGELBACH
LUTHER P. EISENHART	HARRY M. LYDENBERG
ALFRED L. KROEBER	EDGAR H. STURTEVANT
WALDO G. LELAND	CHARLES F. VOEGELIN

INTERNATIONAL RELATIONS

	THOMAS S. GATES
FRANK AYDELOTTE	HARLOW SHAPLEY
PHILIP C. JESSUP	WENDELL M. STANLEY

† Deceased.

PHILLIPS PRIZE

HERBERT FUNK GOODRICH
JOHN DICKINSON
NICHOLAS KELLEY
QUINCY WRIGHT

MAGELLANIC PRIZE

HERBERT FUNK GOODRICH
LYMAN J. BRIGGS
HARVEY N. DAVIS
HARLOW SHAPLEY

LEWIS PRIZE

LUTHER P. EISENHART
WILLIAM F. ALBRIGHT
EDWIN G. CONKLIN

ADMINISTRATION

LUTHER P. EISENHART, Executive Officer and Editor
JULIA A. NOONAN, Assistant Secretary
MARIE A. RICHARDS, Assistant to the Editor
FREDA S. LANKFORD, Assistant in the Office
WILLIAM E. LINGELBACH, Librarian
GERTRUDE D. HESS, Assistant Librarian
RUTH A. DUNCAN, Reference Librarian
FLORENCE M. MOORE, Cataloguer
HELEN KNOLL, Clerical Assistant
RUTH FRANCKSEN, Microfilm Photographer

LIBRARY RESEARCH ASSOCIATES

LYMAN J. BUTTERFIELD
GILBERT CHINARD
THOMAS D. COPE
GEORGE W. CORNER
ISAAC JOSLIN COX
ZELLIG S. HARRIS

J. PERCY MOORE
WILLIAM G. ROELKER
CHARLES COLEMAN SELLERS
CARL VAN DOREN
CHARLES F. VOEGELIN

LIST OF FORMER PRESIDENTS

BENJAMIN FRANKLIN, January 2, 1769—d. April 17, 1790.
DAVID RITTENHOUSE, January 7, 1791—d. June 26, 1796.
THOMAS JEFFERSON, January 6, 1797—resigned, November 23, 1814.
CASPAR WISTAR, January 6, 1815—d. January 22, 1818.
ROBERT PATTERSON, January 1, 1819—d. July 22, 1824.
WILLIAM TILGHMAN, January 7, 1825—d. April 29, 1827.
PETER STEPHEN DU PONCEAU, January 4, 1828—d. April 1, 1844.
ROBERT M. PATTERSON, January 3, 1845—declined office.
NATHANIEL CHAPMAN, January 2, 1846—January 5, 1849.
ROBERT M. PATTERSON, January 5, 1849—January 7, 1853.
FRANKLIN BACHE, January 7, 1853—January 5, 1855.
ALEXANDER DALLAS BACHE, January 5, 1855—January 2, 1857.
JOHN K. KANE, January 2, 1857—d. February 21, 1858.
GEORGE B. WOOD, January 7, 1859—d. March 30, 1879.
FREDERICK FRALEY, January 2, 1880—d. September 23, 1901.
ISAAC J. WISTAR, January 3, 1902—January 2, 1903.
EDGAR F. SMITH, January 2, 1903—January 3, 1908.
WILLIAM W. KEEN, January 3, 1908—January 4, 1918.
WILLIAM B. SCOTT, January 4, 1918—April 25, 1925.
CHARLES D. WALCOTT, April 25, 1925—d. February 9, 1927.
FRANCIS X. DERCUM, April 28, 1927—d. April 23, 1931.
HENRY NORRIS RUSSELL, December 4, 1931—April 22, 1932.
ROLAND S. MORRIS, April 22, 1932—April 24, 1942.
EDWIN G. CONKLIN, April 24, 1942—April 19, 1945.

V

MEETINGS OF THE SOCIETY

ANNUAL GENERAL MEETING, APRIL 24, 25, 26, 1947

OPEN SESSIONS

Thursday, April 24, 11 A.M.

THOMAS S. GATES, President, in the Chair

Clinical Experience with Hemoglobin-Saline Solutions. William R. Amberson, Professor of Physiology, University of Maryland Medical School.

Reinterpretation of the Glacial History of Iowa Based on Studies in Greenland. William H. Hobbs, Professor Emeritus of Geology, University of Michigan.

New Effects in Superconductivity. Donald H. Andrews, Professor of Chemistry, Johns Hopkins University.

Zebulon Montgomery Pike and the Wilkinson-Burr Conspiracy. W. Eugene Hollon, Assistant Professor of American History, University of Oklahoma.

Thursday, April 24, 2 P.M.

WILLIAM B. DINSMOOR, Vice-President, in the Chair

The West Coast Corridor: A Chapter in the Northward Expansion of Mexico. Herbert E. Bolton, Sather Professor Emeritus of History, University of California.

Benjamin Franklin, the American Philosophical Society, and the Russian Academy of Science. Eufrosina Dvoichenko-Markoff, Lecturer, New School for Social Research, New York.

Medical Treasures in the Library of the American Philosophical Society. George W. Corner, Director, Department of Embryology, Carnegie Institution of Washington, Baltimore.

The American Idea of Progress: 1750-1800. Rutherford E. Delmage, Associate Professor of English, St. Lawrence University.

The Genesis and Reception of Jefferson's "Notes on Virginia." Marie Kimball, Curator of the Thomas Jefferson Memorial Foundation, Monticello.

What is it we have got to solve? Are the Jews a State or are they a Religion? Lessing J. Rosenwald, Chairman of the Trustees of the Rosenwald Fund. (Read by Morris Wolf.)

Thursday, April 24, 8.30 P.M.

THOMAS S. GATES, President, in the Chair

THE R. A. F. PENROSE, JR., MEMORIAL LECTURE

The Nürnberg Trial. Francis Biddle, Former Attorney General of the United States.

The Lecture was followed by an informal reception in the Hall.

Friday, April 25, 10 A.M.

HARLOW SHAPLEY, Vice-President, in the Chair

Contributions of Physiology to Problems of Industry. David B. Dill, Scientific Director, Medical Division, Army Chemical Center, Edgewood Arsenal, Md.

The Diffusion and Influence of Locke's *Essay Concerning Human Understanding* in France before Voltaire's *Lettres Philosophiques*. Gabriel Bonno, Professor of French, University of California.

The *Kline* of Sarapis. Herbert C. Youtie, Research Professor of Papyrology, University of Michigan.

Do Judges Make or Discover Law? Zechariah Chafee, Jr., Professor of Law, Harvard University Law School.

High Altitude Research with V-2 Rockets. Ernest H. Krause, Head, Rocket Sonde Research Section, Naval Research Laboratory.

The Place of Science in the Program of UNESCO. Arthur H. Compton, Chancellor, Washington University.

Friday, April 25, 2 P.M.

ALFRED N. RICHARDS, Vice-President, in the Chair

The Future Industrial Position of Oxygen. Earl P. Stevenson, President, Arthur D. Little, Inc.

Biochemical Mechanism of Cellular Oxidation. Eric G. Ball, Professor of Biological Chemistry, Harvard Medical School.

Measurement and Significance of Oxygen Consumption in the Nervous System. Detlev W. Bronk, Professor of Biophysics, Director, Eldridge Reeves Johnson Foundation for Medical Physics; Director, Institute of Neurology, University of Pennsylvania.

Uses of the Separated Stable Isotopes of Oxygen. Hugh S. Taylor, Professor of Chemistry and Dean, Graduate School, Princeton University.

Friday, April 25, 7.30 P.M.

The annual dinner was held at the Bellevue-Stratford, President Gates presiding.

An American Philosophical Society award of \$300 was made to Gilbert Chinard, Professor of French Literature, Princeton University.¹

The following after-dinner address was made:

Plan of the Development of Independence Square and its Environs.

Edwin Owen Lewis, Judge, Court of Common Pleas, Philadelphia.

Saturday, April 26, 10 A.M.

EXECUTIVE SESSION

THOMAS S. GATES, President, in the Chair

Secretary Patterson read the names of the members² who had died since the last meeting while the members present stood as a mark of respect.

Dr. Eisenhart called attention to the YEAR BOOK and stated that it contained a Brief History of the Society written by Dr. Conklin and a list of former resident and foreign members. Preceding the list is a brief statement relative to the union in 1769 of the American Philosophical Society and the American Society into the American Philosophical Society held at Philadelphia for Promoting Useful Knowledge, and the difficulty of ascertaining the date of election of members of both societies. In the printed list the letter "A", "B", or "C" after a member's name indicates to what Society he belonged prior to the union. Dr. Eisenhart further stated that the list is as accurate as it was possible to determine at this time and called attention to the question marks and blanks for names especially in the foreign list. He requested members having any information concerning these to send it to the Executive Office since this list will be published in future YEAR BOOKS and revised accordingly.

Mr. Morgan, Chairman of the Committee on Finance, presented his report and called attention to the report of the Auditor. He stated that a complete report would be found in the YEAR BOOK.

¹ See p. 58.

² See p. 375.

At the Council Meeting the question had been raised whether there should be printed in the YEAR BOOK a complete list of the Society's investments. It was suggested that such a list might be sent occasionally to the members of the Society marked "confidential." After some discussion the matter was referred with power to the Committee on Finance. On motion, the report of the Treasurer and the Auditor was accepted as presented.

President Gates stated that the Council had approved the recommendation of the Committee on Research that an American Philosophical Society award be given at the annual dinner to Gilbert Chinard, Professor of French Literature, Princeton University, for presentation to the Society and publishing in its PROCEEDINGS the following papers:

The American Philosophical Society and the Early History of Forestry in America. (Read November 17, 1944, PROC. Amer. Philos. Soc. 89: 444-488, 1945.)

Eighteenth Century Theories on America as a Human Habitat. (Read October 18, 1946, PROC. Amer. Philos. Soc. 91: 27-57, 1947.)

This award was made because Dr. Chinard was ineligible for the Lewis Prize which by the deed of gift requires the recipient to be an American citizen.

President Gates announced the names of the persons elected by the Council or appointed by him to serve on the Standing Committees of the Society for the coming year.

The following Committee on Finance was nominated by the President and elected for the year 1947-1948:

Marshall S. Morgan, <i>Chairman</i>	Edward Hopkinson, Jr.
Oliver E. Buckley	Nicholas Kelley
Edwin G. Conklin	Charles J. Rhoads
Morris Duane	J. Henry Scattergood

President Gates stated that he had represented the Society on the United States National Commission for UNESCO and that he and Dr. Eisenhart had attended the National Conference on UNESCO which was held in Philadelphia on March 24-26, 1947. He stated that he felt a great deal of progress had been made, and called on Dr. Leland, who presided at these meetings, to make a few comments. Dr. Leland briefly reported on the organization of this Commission and the work of UNESCO.

President Gates stated that his term of one year as the Society's representative on the National Commission for UNESCO would expire in September and that his successor would serve for a three-year term. In accordance with the Council's recommendation, he had appointed a Committee, consisting of a member from each of the four Classes, to report their selection of his successor at this meeting.

Dr. Darrow on behalf of the Committee, consisting of himself, Drs. Schramm, Lingelbach, and Leland, reported that the Committee had selected Mr. Gates to succeed himself and moved that the Society accept the Committee's recommendation. The motion was duly seconded and unanimously carried. President Gates expressed his appreciation of the confidence placed in him by the members of the Society.

President Gates stated that the Council had recommended the appointment of a Committee on International Relations. Dr. Conklin reported that after consultation with members of the Society he was ready to recommend the appointment of a Committee consisting of Harlow Shapley, Wendell M. Stanley, Philip C. Jessup, Frank Aydelotte, and President Gates as Chairman. Dr. Conklin's recommendation was unanimously approved.

Dr. Eisenhart reported that on the recommendation of the Council last October, the Committee on Finance had authorized a payment from the Miscellaneous Fund to the British Society for International Understanding in the amount of \$2,000 for the purpose of restoring Benjamin Franklin's House on Craven Street, London, with the recommendation that a tablet be placed in the house evidencing this contribution and the Society's interest. Dr. Eisenhart further reported that an invitation had just been received from the British Society for International Understanding requesting the Society to send representatives to the formal opening on the afternoon of June 27, 1947, of the Benjamin Franklin House, as a memorial to Dr. Franklin and a center for the promotion of international understanding. If any of the members of the Society were planning to be in London at the time of the celebration, Dr. Eisenhart requested them to please advise him so that they could be appointed to represent the Society on this occasion.³

³ See pp. 231-232.

Dr. Eisenhart, Chairman of the Committee on Research, called attention to the Report in the YEAR BOOK and the list of grants made during the year in the various fields of learning. He stated that at the two meetings of the Committee held in 1947, forty-eight grants had been awarded from the Penrose Fund totalling \$50,425, and two grants from the Johnson Fund totalling \$2,000. Attention was called to the grant of \$3,000 made to the College of Physicians, Philadelphia, from the Reserve Fund to aid in completing its file of publications impaired by the War. On motion the report was approved as presented.

Dr. Schramm, Chairman of the Committee on Publications, presented his report and stated that a complete report would be found in the YEAR BOOK. He stated that Volume 36 of the TRANSACTIONS containing the "History of Chinese Society—Liao" had not been issued as scheduled in 1946, but hoped that it would appear in 1947; meanwhile the volume for 1947 was being published. Reference was made to the publication of Volume 24 of the MEMOIRS containing Carl Van Doren's "Letters and Papers of Benjamin Franklin and Richard Jackson" and Volume 23, Part 2, "Charles Willson Peale, Later Life" by Charles Coleman Sellers. A report was presented on the receipts from sales of publications for 1947 with those since 1942, and on the increase in the number of subscribers and the decrease in the number of exchanges since the institution of the new policy in 1944. The LIBRARY BULLETIN formerly included in the YEAR BOOK would be issued separately and the copy was now in press. The report was approved as presented.

Reporting for the Committee on Library and the Library, Dr. Lingelbach called special attention to the study printed in the YEAR BOOK under the title "The Role of the Library in the Society." It differed somewhat, he said, from the usual report in that it brought to the attention of the members the general relation of the Library to the work and objectives of the Society. In other words, it was not just another report on the year's activities but a statement of the functions of the Library and the work of the Society as a whole, bringing it into line with Dr. Conklin's history of the Society and the list of members from the earliest years to the present. He pointed out that, since the adoption in 1941 by the Society of the Report of the Special Committee on the Library, every effort had been made to translate the principles suggested in that Report into the program of the Library. In the

main these provide for the development of a highly specialized library in fields determined upon by the Committee on Library on the basis of the Report. What these fields are is set forth in the printed report, as are also the accessions, the disposal of duplicates and unrelated holdings, and research activities during the year. Dr. Lingelbach called attention to the accessions acquired during the year either by purchase or gift, outstanding among which are the following three collections of manuscript papers (1) the Franklin-Greene Correspondence, (2) a collection of letters to John Vaughan, and (3) the very large private collection correspondence of the late Dr. Franz Boas extending over a period of seventy years.

In the process of studying the system of exchanges, of weeding out unrelated holdings, etc., attention was called again to the policy of keeping all works that have association value with the membership of the Society, and of having in the Library a special collection of the works of members, manuscripts, or published works, preferably autographed.

In conclusion, Dr. Lingelbach again called attention to the need of an adequate library building, mentioning particularly the state and federal projects for the rehabilitation of "Old Philadelphia."

Dr. Conklin reported on the present division in the four Classes of membership and called attention to the various subjects classified in Class II—Geological and Biological Sciences. He moved the appointment of a Committee consisting of representatives from each of the four Classes to consider this question of the redistribution of subjects within and between these classes to be reported to the Society at its next general meeting. The motion was seconded and unanimously carried.

Dr. Stanley stated that the large attendance at the Executive Session was a testimony of the Society's approval of the rearrangement of the program of the Annual General Meeting, namely, having all papers read at consecutive sessions and the business meeting on Saturday morning, preceded by the formal dinner on Friday evening.

Annual Election

The Society proceeded to the election of officers and members. Joseph Erlanger and Robert L. Schuyler acted as Judges and Morris Duane as Clerk of Election.*

The Tellers subsequently reported that the following officers and members had been duly elected:

OFFICERS

President

Thomas S. Gates

Vice-Presidents

Ross G. Harrison

Alfred N. Richards

St. George L. Sioussat

Secretaries

Ernest M. Patterson

Jacob R. Schramm

Curator

Francis R. Packard

Treasurer

Fidelity-Philadelphia Trust Company

Councillors

(To serve for three years)

Joel Stebbins, *Class I*

Edmund W. Sinnott, *Class II*

Edwin B. Wilson, *Class III*

Howard M. Jones, *Class IV*

MEMBERS

CLASS I—MATHEMATICAL AND PHYSICAL SCIENCES

Resident

Hans Albrecht Bethe, Ithaca, N. Y.

William Albert Noyes, Jr., Rochester, N. Y.

George Braxton Pegram, New York, N. Y.

Henry DeWolf Smyth, Princeton, N. J.

Hassler Whitney, Cambridge, Mass.

CLASS II—GEOLOGICAL AND BIOLOGICAL SCIENCES

Resident

Carl Ferdinand Cori, St. Louis, Mo.
Conrad A. Elvehjem, Madison, Wis.
Hermann J. Muller, Bloomington, Ind.
William Christopher Stadie, Philadelphia, Pa.
Edward Chace Tolman, Berkeley, Calif.

CLASS III—SOCIAL SCIENCES

Resident

Arthur F. Burns, New York, N. Y.
Sidney Bradshaw Fay, Cambridge, Mass.
Walter Lippmann, New York, N. Y.
Robert Redfield, Chicago, Ill.

Foreign

Henry Clay, Oxford, England
Luigi Einaudi, Turin, Italy

CLASS IV—HUMANITIES

Resident

Otto Neugebauer, Providence, R. I.
Reinhold Niebuhr, New York, N. Y.
Paul Joseph Sachs, Cambridge, Mass.
Stith Thompson, Bloomington, Ind.

Foreign

Sir William David Ross, Oxford, England
William Woodthorpe Tarn, Inverness, Scotland
Lionello Venturi, Rome, Italy

COUNCIL NOMINEE

Lessing J. Rosenwald, Jenkintown, Pa.

One hundred and fifty members and approximately two hundred guests attended the meeting.

The following previously elected members subscribed the Laws and were admitted into the Society during the course of the meeting: Stanhope Bayne-Jones, Herbert Eugene Bolton, Zechariah

Chafee, Jr., Bernadotte Everly Schmitt, John Clarke Slater, and Sumner Huber Slichter.

Arnold J. Toynbee of London, England, signed the Laws on March 7, Hendrik A. Kramers of Leiden, Netherlands, on March 12, and Frederic C. Bartlett of Cambridge, England, on April 15, 1947.

AUTUMN GENERAL MEETING, NOVEMBER 20, 21, 1947

OPEN SESSIONS

Thursday, November 20, 10 A.M.

THOMAS S. GATES, President, in the Chair

The Discovery of an Oil Field. Paul D. Foote, Executive Vice-President, Gulf Research and Development Company.

Benjamin Rush as a Promoter of Useful Knowledge. Lyman H. Butterfield, Assistant Editor, The Jefferson Papers, Princeton University.

The Cultural Relations Attaché as an Instrument of International Understanding. Hayward Keniston, Dean, College of Literature, Science and the Arts, University of Michigan.

Reading and Visual Fatigue. Leonard Carmichael, President, Tufts College.

Environment and Culture in the Last Deglaciation. Carl O. Sauer, Professor of Geography, University of California.

Scholarship and the Intelligence Problem. William L. Langer, Coolidge Professor of History, Harvard University.

Thursday, November 20, 2 P.M.

ROSS G. HARRISON, Vice-President, in the Chair

Physiology of Exposures to Abnormal Concentrations of Respiratory Gases. Wallace O. Fenn, Professor of Physiology, University of Rochester, School of Medicine and Dentistry.

The Migration of the Methyl Group in the Body. Vincent du Vigneaud, Professor of Biochemistry, Cornell University Medical College.

Fragments of a Greek Uncial Manuscript in Washington. Werner Jaeger, Professor of Classical Philology, Harvard University.

Ancient Mathematics and History of Civilization. O. E. Neugebauer, Professor of the History of Mathematics, Brown University.

Man's Greatest Illusion. Robert L. Schuyler, Gouverneur Morris Professor of History, Columbia University.

Streptomycin in the Treatment of Infections. Chester S. Keefer, Physician in Chief, Massachusetts Memorial Hospitals; Professor of Medicine, Boston University, School of Medicine.

Thursday, November 20, 8.30 P.M.

THOMAS S. GATES, President, in the Chair

THE FRANKLIN MEDAL LECTURE

Young Washington. Douglas S. Freeman, Editor, *The Richmond News Leader*.

The Lecture was followed by an informal reception in the Hall.

Friday, November 21, 9.30 A.M.

ST. GEORGE L. SIOUSSAT, Vice-President, in the Chair

Franklin-Greene Correspondence. William G. Roelker, Director, Rhode Island Historical Society.

The Lipit-Ishtar Law Code. Francis R. Steele, Assistant Curator, Babylonian Section, University Museum, University of Pennsylvania.

Fundamental Issues Raised by Growth of Trade Unions. Sumner H. Slichter, Lamont University Professor, Harvard University.

Why Union Education?—Aims, History, and Philosophy of the Educational Work of the I. L. G. W. U. Mark Starr, Educational Director, International Ladies' Garment Workers' Union.

Cepheids of the Small Magellanic Clouds. Harlow Shapley, Director, Harvard College Observatory.

The Freedmen and the Slaves of God. William Linn Westermann, Professor of Ancient History, Columbia University.

Friday, November 21, 2 P.M.

EXECUTIVE SESSION

THOMAS S. GATES, President, in the Chair

Secretary Patterson read the names of the members⁴ who had died since the last meeting while the members present stood as a mark of respect.

⁴ See p. 375.

Proceedings of the Council at its meeting on November 20 were presented.

President Gates reported that the Society was represented at the formal opening of the Benjamin Franklin House on Craven Street, London, on June 27, by Sir Henry Hallett Dale, Arnold J. Toynbee, C.E.K. Mees, and Linus C. Pauling. The Society's gift of \$2,000 for the purpose of restoring this house was very much appreciated and Dr. Gates stated that there is a plaque recognizing the Society's participation in the renovation of the building. He further reported that the British Society for International Understanding had sent to the Society as souvenirs of this meeting four beautiful Wedgwood plaques, two of Franklin and two of Lafayette.⁵

President Gates reported that a letter had been received from His Excellency The Right Honorable The Lord Inverchapel of the British Embassy offering to present to the Society on behalf of the Lords Commissioners of the Admiralty certain engraved copper-plates of cancelled naval charts, namely, *A Chart of Delaware Bay, June 1779*, and *The Counties of Philadelphia, Bucks, and Chester, with the towns of Wilmington, Chester, Philadelphia, and Bristol, February 1777*. Dr. Gates stated that Lord Inverchapel had been informed that the Society would be very pleased to receive this gift.

Mr. Morgan, Chairman of the Committee on Finance, gave an account of the financial situation of the Society and copies of the report were distributed. Mr. Morgan stated that at the meeting of the Council and the Executive Session of April 1947 the question was raised whether the list of securities of the Society should be published in the YEAR BOOK. It was voted at that time to refer this question to the Committee on Finance. The Committee at its meeting on November 13 was favorable to the publication of the list in such form as the Society would determine. Mr. Morgan further stated that the question had again been considered by the Council at its meeting on November 20 and it was voted that the list of securities be mimeographed for distribution on request from members. On motion, the report of the Committee and the Budget for 1948 were approved.

Mr. Morgan reported that in 1941 the Society had approved the revision of the Building Fund Trust Agreement with the Girard

⁵ See p. 232.

Trust Company and the creation of a new Deed of Trust, but that no definite steps had been taken until November 3, 1947 when the Committee on Finance considered revising the Building Fund Trust Agreement in accordance with the approval of the Society. He further reported that the Council of the Society took action along the lines suggested by the Committee on Finance, a record of which is in the Minutes of the Council Meeting, November 20, 1947. On motion, it was voted to approve the action of the Council.

Dr. Eisenhart, Chairman of the Committee on Research, presented a summary of the work of the Committee since the first of the year. He stated that the Committee had available this year for grants from the Penrose Fund \$82,847.61. Ninety-one grants have been approved totalling \$82,098.05 leaving a balance of \$745 for the remainder of the year. However, there is available in the Reserve Fund over \$138,000. The Committee during the year awarded eleven grants from this Fund amounting to \$28,150. Nine grants have been approved from the Johnson Fund totalling \$8,300, leaving a balance of \$15,700. Dr. Eisenhart further reported that a grant of \$1,000 had been approved from the Michaux Fund to enable Mr. Philibert Guinier of France to come to the United States to investigate whether certain American trees and forestry methods could be used in France.

Dr. Eisenhart stated that the Council had considered the question which had been raised recently with the Committee on Research whether the Society would be interested in setting aside a certain portion of the Reserve Fund for fellowships to be known as the APS UNESCO Fellowships or any other title that the Society might select. This matter has now been referred by the Council to the special Committee on International Affairs with a request that it confer with persons or committees interested and report back to the Council at its April meeting.

Dr. Schramm, Chairman of the Committee on Publications, called attention to the contract which had been entered into with the Princeton University Press for the publication of the MEMOIRS in the future. In accordance with the contract, the Society's sole financial commitment is that it will purchase five hundred copies of each book at the list price, less 40 per cent discount, and additional copies on the same basis. It is agreed that the Princeton University Press would in general publish any MEMOIR recommended by the Committee; if, in any case, which would be ex-

tremely rare, the Press would not undertake the publication of such a MEMOIR it would be for the Committee to decide whether it was advisable for the Society to publish it in view of the study which the Press would have made. The contract may be terminated on a six months' notice either by the Society or the Press. The report was accepted as presented.

Dr. Lingelbach, reported for the Committee on the Library, mentioning several recent activities. There have been some quite exceptional accessions. During the summer the members of the Bache family offered the remainder of their Franklin collection for sale at auction. The Society bought, after a careful study of the offerings, some significant books from Franklin's own library, and a set of over four hundred brass stencils which came directly from Passy. During the summer there was considerably more use of the Library for individual research than heretofore. The more highly specialized research in the Society's collections is in part, of course, related to the system of Library Research Associates. In general, the results of this system have been very gratifying. Through cooperation with the Committees on Research and Publications three works have been published and seven are in the course of preparation.

There has been developed a constructive program in American archæology paralleling one already reported to the Society by Dr. Lydenberg in the field of American linguistics. Dr. Kidder, the Chairman of the special committee, spoke of the urgent need of archæological and linguistic work in connection with the Six Nations and allied groups and reported as follows the recommendations of the special committee as adopted by the Committee on the Library for guidance in the development of the program:

1. That archæological activities be confined to the area from the mouth of the Susquehanna to Lake Huron and from the St. Lawrence watershed to the eastern seaboard.
2. That a research associate in archæology be appointed.
3. That an exploration be made, by consultation with experts, of the possibilities of dendrochronological research in the north-eastern area.
4. That the cooperation of the National Research Council be sought for the revision and reprinting of its guide for amateur archæologists and that consideration be given to the prepara-

tion of a supplementary elementary guide for the northeastern area.

5. That close contact be maintained with State and local archaeological agencies with particular emphasis on encouragement and assistance to promising young archaeologists.
6. That consideration be given to possible archaeological participation in the proposed study of the political and cultural history of the Iroquois, and
7. That a union list of manuscript materials in American Indian linguistics be inaugurated.

On motion it was voted to accept Dr. Kidder's recommendations which have come to the Society as recommendations of the Committee on the Library.

One hundred and thirty-eight members and about one hundred guests attended the Meeting.

The following recently elected members subscribed the Laws and were admitted into the Society during the course of the Meeting: John Nash Douglas Bush, Conrad Arnold Elvehjem, Sidney Bradshaw Fay, Douglas Southall Freeman, Werner Wilhelm Jaeger, Hayward Keniston, William Leonard Langer, Owen Lattimore, Edwin Owen Lewis, Marston Morse, Otto E. Neugebauer, William Albert Noyes, Jr., George Braxton Pegram, Lessing J. Rosenwald, Frederick Seitz, Jr., William Christopher Stadie, Henry DeWolf Smyth, and George Hoyt Whipple.

MEETINGS OF OTHER ORGANIZATIONS

HELD IN THE HALL OF THE SOCIETY

THE ARCHÆOLOGICAL INSTITUTE OF AMERICA,
PHILADELPHIA SOCIETY

January 14, 8.15 P.M. Dean George H. Chase, Harvard University.
The Ara Pacis Augustae.

March 20, 8.15 P.M. Dorothy K. Hill, Curator of Ancient Art, The Walters Art Gallery, Baltimore. Pots and Pans in Greece and Rome.

October 16, 8.15 P.M. Francis R. Steele, University Museum, University of Pennsylvania. The Oldest Law Code in the World.

AWARD OF THE JOHN SCOTT MEDAL AND PREMIUM

December 18, 8.30 P.M. Dr. Florence B. Seibert, Associate Professor of Biochemistry, Henry Phipps Institute, Philadelphia, for the development of the purified protein derivative of tuberculin.

The Corporation and Board of Directors of the Union Library Catalogue of the Philadelphia Metropolitan Area—January 9.

American Council of Learned Societies, Executive Committee—January 11.

Weeders Garden Club—February 25.

Eighth Conference on Science, Philosophy, and Religion in their Relation to the Democratic Way of Life. September 7, 8, 9, and 10

Wistar Association, November 13.

Regional Committee on the Rhodes Scholarships—December 10, 13.

VI

REPORTS OF STANDING COMMITTEES

1. REPORT OF THE COMMITTEE ON HALL

The Committee on Hall for the year 1947-1948 consists of the following members: Francis R. Packard, *Curator, Chairman*, Edwin G. Conklin, Edward Hopkinson, Jr., Fiske Kimball, Edwin O. Lewis, William E. Lingelbach, Marshall S. Morgan, Lawrence J. Morris, Thomas J. Wertenbaker, and *ex-officio*, Thomas S. Gates, *President*, and Luther P. Eisenhart, *Executive Officer*.

There were no formal meetings held during the year. No steps were taken during 1947 in connection with the restoration of the exterior of the building which had previously been considered by the Committee on Hall and approved in principle by the Council and at the Executive Session of the Society.

In May 1946 there was placed in the Hall a portrait of General Herman Haupt, a member of the Society from 1871 to 1905, which was presented by the artist, Miss A. M. Archambault, together with a biographical sketch of General Haupt which was deposited in the Library.

During the year 1947 the Society received and placed in its Hall a portrait of George D. Rosengarten, a member of the Society from 1919 to 1936, which was painted by Nicol Schatterstein and bequeathed to the Society by Mrs. Rosengarten.

There was purchased for the Hall a very fine portrait of Sir Isaac Newton, a copy presumably after a portrait by John Vanderbank.

The plot of ground in the yard has been cultivated and in the spring there were planted bulbs, pachysandra, ivy, and climbing roses.

At the Autumn General Meeting on November 20 a *Franklinia* tree was presented by Charles F. Jenkins and planted near the entrance on the west side of the Hall on Independence Square.

Arrangements have been made to have installed automatic glass fire extinguishers throughout the building and in the Library vault in the Drexel Building.

2. REPORT OF THE COMMITTEE ON LIBRARY

The Committee on Library presents the following report for the calendar year 1947.

COMMITTEE: PERSONNEL AND MEETINGS

The Committee consists of William E. Lingelbach, *Chairman*, Julian P. Boyd, Gilbert Chinard, George W. Corner, Karl K. Darrow, Waldo G. Leland, Harry M. Lydenberg, J. Percy Moore, A. S. W. Rosenbach, Richard H. Shryock, St. George L. Sioussat, Carl Van Doren, and *ex officio* Thomas S. Gates, *President*, and Luther P. Eisenhart, *Executive Officer*.

Four regular meetings were held during the year on February 20, May 15, October 23, and December 18.

ACCESSIONS

In each Report for the past several years it has been possible to announce the acquisition of a noteworthy addition to the Library's collection of Frankliniana. This year has been no exception for, together with important holograph letters and significant printed items including six volumes formerly in Franklin's Library,¹ there was acquired a collection of over four hundred brass stencils, consisting of designs for letters of the alphabet, numerals, decorative pieces, a monogram, and visiting card (fig. 1), which



FIG. 1

Dr. Franklin had made and used in connection with his private press at Passy—another link with “B. Franklin, printer.”

New source materials on the story of Franklin's activities as printer and publisher, from the nature of the case, appear very

¹ See list of selected accessions, pp. 83-84.

infrequently for the subject has interested professionals and amateurs continuously for more than a century. The guilds of the printing trade and of the publishing profession have joined historians and other scholars in the quest for information on this aspect of the life of the many-sided Franklin. As the year 1948 marks the two-hundredth anniversary of Franklin's formally announced "retirement" from the printing business, it seems fitting to call attention here to the considerable amount of hitherto unused, and in cases quite unknown, material which has been brought together in the Society's Library in recent years.

As often happens, Franklin's resolution to retire, unless interpreted altogether literally, was considerably modified as the years passed. Not only did he continue some of his most profitable partnerships, but, if the term printing is used in the broad sense in which he himself employed it, he continued a printer to the end of his life. Hence, although he retired from active participation in his Philadelphia printing and publishing business, he never really divorced himself from the trade and profession. Even when most harassed by the bitter quarrels with the Proprietary, and later with the Tory government in London, he had recourse to it as his most effective means of getting a hearing, and influencing public opinion both in England and America. Still later, when the Revolution had started, and he was sent by Congress to Paris, he very soon set up his famous Passy press, which he employed not only to print his "bagatelles," but used with telling effect in promoting the cause of the Revolution, and in assembling and bringing to America, after the conclusion of his successful mission, what was probably the finest printing equipment of the time in this country.

The new materials relate to every period of Franklin's life. First in chronological order of the additions to the little explored Account Books kept by Franklin himself in connection with his printing and publishing business for the twenty years from 1728 to 1748, is a manuscript volume entitled "Franklin-Hall, No. 1," a companion volume to "Work Book, No. 2."² For the years of the partnership with Hall from 1748 to 1766, there are now available eight additional Account and Letter Books kept by David Hall, one of which has the intriguing title, "Account Book for Work Done for the Province of Pennsylvania, Nov. 11, 1756-June

² In the possession of the New York Public Library.

18, 1767—Franklin & Hall.” These are supplemented by a group of private letters to Hall from Will Strahan, King’s printer, and close friend of Franklin, and Hall’s “Shop Book” with its amazingly interesting and important day-by-day entries of the purchase of books, paper, quills, etc., by individuals and institutions. There are also Franklin’s correspondence with Richard Jackson, and incidental references in his letters to his favorite sister, Jane Mecom, and his life-long friend, Catharine Greene.³ Added to these are newspaper articles, essays, and pamphlets now definitely identified as having been written by Franklin.

First in point of interest and importance among the new materials on the Passy period is the collection of beautiful brass stencils (fig. 2) mentioned above. Hitherto unknown, and belonging to a class of Frankliniana of which there are practically no survivals, they are unique. Equally important, though quite different in character, is Franklin’s “Cash Book” (fig. 3) for the Passy years, with entries in his own hand. Other items consist of the “Account Books for Family Expences” kept by William Temple Franklin, “Inventories of fonts cast at Passy,” of lists of type and other printing materials purchased from the leading English, French, and possibly Dutch type-founders, and definite information on the purchase of a type-foundry and presses. On the plans to teach his young grandson, Benjamin Franklin Bache, the printing trade and set him up in business in America, there is also some new material to supplement Benny’s Diary.

Taken as a whole, this new evidence supplies detailed information, not only on Franklin’s printing and publishing during the first half of his life, but also on the remarkable continuance of his printing and publishing activity in his later years. Despite the pressure of social life at Passy, on the one hand, and the exacting demands of diplomacy and the affairs of state, on the other, Franklin’s interest in printing and publishing increased rather than diminished as he grew older. To what extent this material will affect the findings of Livingston, McMurtrie, Oswald, Wroth, and other specialists on this aspect of Franklin’s work, or the conclusions of Van Doren and earlier biographers remains to be seen.

³ Of the new materials in this group recently acquired by the Library, the following arrangements for editing and publishing have been made by the Society: *Letters and Papers of Benjamin Franklin and Richard Jackson, 1758-1785*, ed. by Carl Van Doren, and published by the Society in 1947; Franklin’s correspondence with Jane Mecom by Carl Van Doren, and the Franklin-Greene correspondence by William Greene Roelker are also in preparation.

That it will add richness and very often positive testimony to some conclusions which were necessarily tentative will be obvious even from this brief survey of the material, and has its place in the historiography of B. Franklin, Printer.⁴

Montin des caractères fournis par Berry
au sieur le sieur Franklin c'avoins

2 caractères may & cul	16
2 dite a 12 ^e	12
11 caractères en romain qu'il a ligues	44
2 caractères de lettres romaines	16
6 barrière a 10 ^e	6
4 baton en creux de la chaine a 12 ^e	8
6 Brosse a 12 ^e	3
pour la boîte	12
le bit de visite	8
	6
total	122
	12
	3
	11
	12
	8
Recu le montant	120
à la page 29 de la machine	3
1781. Berry	

FIG. 2. Receipted bill for stencils purchased by Franklin.

In addition to the Frankliniana, the source material in the history of American science and culture was enriched by several small collections. Sixteen letters written by Benjamin Smith Barton to Thomas Pennant, English naturalist, during the years 1790 to 1794, reflect the writer's interest in various aspects of

⁴For a more detailed study on this subject, see W. E. Lingelbach, B. Franklin, printer—new source materials, *Proc. Amer. Philos. Soc.* 92(2), 1948; *Lib. Bull., Notes & Hist. Documents, Amer. Philos. Soc.* 1948.

Dr,

Safely April 22. 1780

At	Money paid &c.	L.	S.	D.	Money received &c.	L.
	Hemery —	48			Recd of W.	
	Breuville —	24			T. F. part of	
	Roque —	6			a sum put into	
	Madelon —	6			his hands for 84	
		54			pieces of Family	
					20 Louis	180
23	Paid (sic) for a					
	Priseglasse, and sund					
	ry things —	45				
24	Bought of Tugnie					
	two Presses for					
	the use of the Secre-					
	tary's Office, which					
	cost —	200	9	0		
	Drew an Order on					
	W Grand for the same					
	Note, As I propose					
	to keep them after					
	my Mission here is					
	finish'd, they must					
	be put to my private					
	Account —					

FIG. 3. Cash Book entry for purchase of presses.

natural history, his theories on the American Indians, yellow fever, and the politics of the day. An unrecorded broadside of particular interest to the Society was enclosed in one of the letters. It was issued on April 17, 1792, by a committee of the American Philosophical Society, consisting of Thomas Jefferson, B. S. Barton, James Hutchinson, and Caspar Wistar, and pertained to the collection of material on the Hessian fly. Additions were made to the Priestley Papers. Sixteen items were added to the collection of letters from Benjamin Vaughan to his brother, John, some of which supplement information known about Vaughan's edition of the *Rural Socrates* which he published in Hallowell, Maine, in 1800. From Mrs. Vernon Lynch came a collection of more than one hundred lectures prepared by Herbert S. Jennings, former member of the Society, during the years 1898 to 1945, many of which are unpublished. Mrs. Lynch plans to augment this collection with diaries and other personal material upon the completion of her biography of Dr. Jennings.⁵

The Committee acknowledges the receipt of gifts from the following persons and institutions: Academy of Natural Sciences of Philadelphia, Seymour Adelman, American Philosophical Association, Baltimore Municipal Museum, Albert C. Baugh, Harry Bernstein, Julian P. Boyd, British Book News, British Survey, Carnegie Endowment for International Peace, Carnegie Foundation for the Advancement of Teaching, Carnegie Institution of Washington, Maurice Caullery, Mrs. E. R. Cheston, Gilbert Chinard, Chrysler Corporation, Conference on Science, Philosophy and Religion, Edwin G. Conklin, Thomas D. Cope, William C. Deeming, Dropsie College, Edward Dumbauld, Ruth A. Duncan, Pierre S. du Pont, Howard N. Eavenson, Charles Edison, Luther P. Eisenhart, España Consejo Superior de Investigaciones Científicas de Madrid, Fidelity-Philadelphia Trust Company, Fondation Universitaire de Belgique, Grant Foreman, Francis A. Foster,

⁵ Accessions for the year include 413 volumes, of which 94 are serials; 234 pamphlets; 5 broadsides; 278 manuscripts; 158 microfilms, photostats, and typescripts; 175 maps; 15 newspapers; 614 engravings, prints, and photographs; 1 portrait; 2 medals; 2 plaques; 2 brass scientific instruments; and a set of 413 brass stencils. Items withdrawn during the year numbered 325, among which 75 were duplicates or uncatalogued. Total holdings consist of 103,040 volumes, of which 70,663 are serials; 39,352 pamphlets; and 7,100 maps. There have been catalogued 369 printed items and 481 manuscripts, photostats, and microfilms; 667 analytics, 201 association items, 28 autographs, 7 bookplates, 5 broadsides, 10 duplicates, and 134 early imprints have been noted. Altogether 4,690 cards have been added to the main catalogue and special files.

Com. Hist. de France, Edgar S. Gardner, Paul L. Garvin, Thomas S. Gates, James E. Gibson, Girard College, Goodspeed's Book Shop, Greenwich Observatory, Ferdinand R. Hassler, H. M. Stationery Office, Historical and Philosophical Society of Ohio, Alban W. Hoopes, William J. Humphreys, Indian Rights Association, Instituto Panamericano de Bibliografía y Documentación, Dugald C. Jackson, Charles F. Jenkins, John Rylands Library, A. V. Kidder, Helen K. Krauss, Lankenau Hospital, Latvian Legation, Shippen Lewis, Albert H. Lieberman, William E. Lingelbach, Esmond R. Long, Mrs. Vernon Lynch, Emmanuel de Margerie, Massachusetts Historical Society, John A. McConomy, Robert D. Meade, C. E. Kenneth Mees, Republic of Mexico, Milbank Memorial Fund, Wyndham Miles, Silvia E. Morales Gorleri, National Research Council, New York Zoological Society, James Bennett Nolan, Merle M. Odgers, Antonio Pace, Pan American Union, Mary Cathryne Park, George H. Parker, Robert S. Peabody Foundation for Archæology, Penn Mutual Life Insurance Company, Edgar Legare Pennington, Commonwealth of Pennsylvania, Pennsylvania Forestry Association, Philadelphia Bibliographical Center and Union Library Catalogue, Free Library of Philadelphia, Philadelphia Museum of Art, Princeton University, Queens Borough Public Library, Museo Nacional de Rio de Janeiro, A. Willis Robertson, Rockefeller Foundation, William Greene Roelker, Albert L. Rohrer, A. S. W. Rosenbach, Lessing J. Rosenwald, Joseph P. Rumberger, Jr., Carl P. Russell, Charles Coleman Sellers, Richard H. Shryock, Social Science Research Council, Sociedad Geografía de Cuba, Sociedad Mexicana de Historia Natural, Societas pro Fauna et Flora Fennica, Public Library of South Australia, Paul M. Spurlin, M. J. Steiner, D'Arcy W. Thompson, UNESCO, Union Pacific Railroad, U. S. National Archives, U. S. National Park Service, U. S. Naval War College, U. S. Department of State, U. S. War Department, University of Montreal, University of Pennsylvania, University of Pittsburgh, Viking Fund, Virginia State Library, Bailey Willis, Herbert E. Winlock, Woods Hole Oceanographic Institution, World Calendar Association, Historical Society of York County.

PROGRAM IN AMERICAN INDIAN LINGUISTICS AND ARCHÆOLOGY

Progress has been made during the year in the American Indian linguistic projects under the supervision of Zellig S. Harris and

C. F. Voegelin. Work has been carried on in the Cherokee, Ottawa, Kutenai, and Seneca languages with subventions made from the Phillips Fund and in cooperation with the Committee on Research. The Boas Collection, both linguistic items and the correspondence, is being utilized. Continued processing of the correspondence was made possible by a grant of \$1,000 from Dr. Ernst Boas. Muriel Rukeyser, author of *Willard Gibbs*, has been chosen to write the biography of Franz Boas. The editing of Dr. Boas's *Kwakiutl Grammar*, by Helene Boas Yampolsky and Zellig S. Harris, has been completed, and was published in the Society's *TRANSACTIONS*, n.s., vol. 37, pt. 3.

To implement further the use of the Phillips Fund by coordinating a program in American archæology with that in linguistics, a conference was called on October 18, 1947.⁶ The persons attending were: William N. Fenton, Smithsonian Institution, James B. Griffin, University of Michigan, Zellig S. Harris, University of Pennsylvania, Alfred V. Kidder, *Chairman*, Carnegie Institution of Washington, Harry M. Lydenberg, J. Alden Mason, University Museum, Froelich G. Rainey, University Museum, William A. Ritchie, Rochester Museum of Arts and Sciences, Frank G. Speck, University of Pennsylvania, Charles F. Voegelin, Indiana University, Paul A. W. Wallace, Lebanon Valley College, John Witthoft, and Messrs. Eisenhart and Lingelbach. S. K. Stevens, Pennsylvania State Historian, was also invited. The following recommendations were made which have since been approved in principle by the Committee on Library and the Council of the Society:

1. The area to be studied be restricted to the Iroquois and allied groups.
2. An effort be made to stimulate the training of personnel, especially of younger men.
3. A union list of Indian manuscript material be compiled.
4. Endorsement of Mr. Fenton's study of the political and cultural history of the Six Nations, and investigation of the feasibility of a dendrochronological study.
5. A manual for the use of amateur archæologists for the Iroquois area be compiled in consultation with the National

⁶ For detailed report on the Conference see H. M. Lydenberg and A. V. Kidder, The Society's program in American linguistics and archæology, *Proc. Amer. Philos. Soc.* 92(2), 1948; *Lib. Bull., Notes & Hist. Documents*, *Amer. Philos. Soc.* 1948.

Research Council which is to be urged to revise and reprint its general guide for amateur archæologists.

6. Appointment of a Library Research Associate in American Indian archæology and anthropology.

LIBRARY RESEARCH ASSOCIATES

Three new appointments for Library Research Associates were made—Thomas D. Cope for his study on Mason and Dixon's line, Isaac Joslin Cox for his work on the Hunter and Freeman journals on early western travels, and Carl Van Doren for editing the Franklin-Mecom Correspondence. Mr. Van Doren's former study on the Franklin-Jackson Correspondence and Charles Coleman Sellers' second volume of his biography of Charles Willson Peale were published early in the year as Volumes 24 and 23, pt. 2 respectively of the Society's MEMOIRS. The projects of the other Research Associates as listed in last year's Report are nearing completion.

LIBRARY BULLETIN

Since its inception in 1943, the LIBRARY BULLETIN has been wholly or in part a reprint from the Annual Report of the Committee on Library as published in the YEAR BOOK. This year it is to appear as a single number of the PROCEEDINGS, from which reprints will be made and issued as separates with some additional material and a revision in the title: LIBRARY BULLETIN, NOTES AND HISTORICAL DOCUMENTS. The current number, carrying the imprint date of 1948, is to commemorate the two-hundredth anniversary of Benjamin Franklin's official retirement from his printing and publishing business. It will include the following articles:

B. Franklin, Printer—New Source Materials. William E. Lingelbach.

Dr. Franklin Negotiates—December 1777. Gilbert Chinard.
Charles Willson Peale's Career as a Painter. Charles Coleman Sellers.

Henry Ernest Muhlenberg. Paul A. W. Wallace.

Collecting Source Materials about Charles Mason and
Jeremiah Dixon. Thomas D. Cope.

The Freeman Red River Expedition. Isaac Joslin Cox.

The Scaliger Family Documents. Vernon Hall, Jr.

The Society's Program in American Linguistics and Archæology.

American Linguistics. Harry Miller Lydenberg.

American Anthropology and Archæology. A. V. Kidder.

Efforts to make the rich resources of the Library more widely known are reflected in the steadily increasing number of readers, mail and telephone inquiries especially for microfilm service, and items lent upon the interlibrary loan. It is of interest to note that the record of persons using the Library in 1947 numbers some three hundred thirty more than for last year.⁷

During the summer the American Philosophical Society, in accordance with the wishes of President Gates and members of the Council, cooperated with the American Heritage Foundation by sending the William Penn Charter of Liberties (1701) to Washington as the Society's contribution to "The History and Significance of Basic Documents of American Liberty" to make the tour of the nation on the Freedom Train. It is fully described on pages 8 and 9 of the Official Book of the Freedom Train, *Heritage of Freedom*, by Dr. Frank Monaghan.⁸

In accordance with the more specialized policy for the use of the Henry M. Phillips Fund, the Library's subscriptions to the majority of periodicals in classical and Oriental archæology were discontinued. The files of these journals are being sold and the proceeds credited to the Phillips Fund. To date more than \$1,000 has been realized. Weeding out in other fields of irrelevant materials continues slowly—thirty-two yellow-fever items were sold to the University of Rochester; a considerable amount of census material and run-of-the-mill duplicates has been disposed of on a potential exchange basis. Surveys of the holdings in engineering and geology are under way.

Work on the revision of foreign exchanges is nearing completion. The Smithsonian International Exchange Service resumed sending material to Germany and Austria which enabled us to reestablish exchange relations with former accounts in most of the European countries. Dr. Arthur P. Whitaker is making a survey

⁷ During the year 890 persons consulted material in the Library, and 58 institutions borrowed 214 items on the interlibrary loan. The Photoduplication Service has filled 100 outside orders in addition to the work for the Library, all of which amounted to 7,030 frames of microfilm and 2,669 prints.

⁸ Princeton Univ. Press, 1947.

of the Latin American institutions which will provide a basis for a more selective as well as wider distribution of the Society's publications in that territory. A three-year provisional exchange privilege has been granted to certain universities in Europe and Asia.

FINANCIAL STATEMENT

Administration Fund

Appropriation for 1947	\$ 3,000.00
Receipts from microfilm work	540.76
	<hr/>
	\$3,540.76
Expended during 1947	3,406.34 ^a

Books and Manuscripts Fund

Appropriation for 1947	25,000.00
Expended during 1947	19,345.85

Miscellaneous

Gift from Ernst Boas for Processing the Boas Collection.....	1,000.00
Expended during 1947	745.01
Proceeds from library sales	250.00

Special Library Funds

Balances 1/1/47	Income	Expended	Transferred to Principal	Balances 12/31/47
\$34,387.56	\$10,710.91	\$3,347.60	\$1,175.45	\$40,575.42

SELECTED ACCESSIONS

FRANKLINIANA

- Franklin, B. Letter to Mr. [Richard] Bache; London, Aug. 22, 1772. Draft of A.L.S. 1 p.
- to St. John Crèvecoeur; Phila., Feb. 16, 17, 1788. Photo. of A.L.S. 2 p. and add.
- to Mr. [John] Foxcroft; London, Aug. 22, 1772. Draft of A.L.S. 2 p.
- to Mrs. [Catharine Ray] Greene; Phila., March 2, 1789. Letterpress copy of A.L.S. 2 p.
- to Duc de Rochefoucauld [d'Enville]; April 25, Nov. 17, 1777; Jan. 21, Feb. 6, Feb. 12, Feb. 18, March 3, 1778; March 31, 1781; Oct. 24, 1788; and 3 undated. Microfilms and photostats from originals in the Bibliothèque Municipale at Besançon, France and Nantes, France.
- to Arthur Lee; Passy, April 5, 1778. A.L.S. 1 p. and add.
- to Mr. [Le Ray] de Chaumont; Phila., Oct. 22, 1787. A.L.S. 1 p.
- to [Jean Paul Marat?]; Passy, March 29, 1779. A.L.S. 1 p.
- to Dr. [John] Morgan; London, July 8, 1765. A.L.S. 1 p. and end.

^a Includes salary of photographer.

- to Rich[ar]d Peters [Aug. 1775]. A.L.S. 1 p. and end.
- to W[illia]m Strahan; Sept. 17, 1744. A.L.S. 1 p. and add.
- to W[illiam] Strahan; Phila., Nov. 28, 1747. A.L.S. 1 p. and add.

Presented by Thomas S. Gates

- to [William] St[raha]n; New York, March 29, 1776. Copy of L. 2 p. and end.
- to his Excellency [Comte de Vergennes? ca. 1777-1778]. A.Dr. of L. 2 p.
- to Susanna Wright; Monday morning [June 1755?]. Photo. of A.L.S. 1 p. and add.

Presented by Julian P. Boyd

- Pennsylvania. Supreme executive council. Deed for tract of land in Westmoreland county granted to Benjamin Franklin; Nov. 1, 1787. Photo. of D. 1 p.

Presented by William E. Lingelbach

- Writ of assistance for Benjamin Elliott; Phila., Oct. 30, 1785. Printed D.S: B. Franklin, pres. 1 p. and end.

Franklin, Benjamin. Autobiografia; tr. . . . di Guido Fornelli. Firenze [1924].

- Descrizione della stufa di Pensilvania . . . Venezia, Apollinare, 1791.
- Manuel de philosophie pratique, pour servir de suite à la science du Bon-homme Richard. Lausanne, Ravanel, 1795.
- Mélanges de morale . . . 2d ed. Paris, Renouard, 1826. 2 v.
- Poor Richard improved . . . 1760. Philadelphia, Franklin and Hall [1759].
- Poor Richard improved . . . 1766. Philadelphia, Franklin and Hall [1765].
- Quatuor pour trois violons et violoncelle; tr. de Guillaume de Van. Paris, Odette Lieutier, 1946.
- Reflections on courtship and marriage . . . Harrisburg, Allen and Wyeth, 1793.
- La science du bonhomme Richard . . . 3d ed. Paris, Rualt, 1778.
- La science du bonhomme Richard . . . 4th ed. Avignon, Guichard, 1779.
- Some account of the success of inoculation for the small-pox in England and America. London, Strahan, 1759.
- The way to wealth. Otley, n.d. Broadside.
- Bowle's moral pictures; or Poor Richard illustrated. London, Bowles and Carver [ca. 1800]. Broadside.
- [Wharton, Samuel] Plain facts: being an examination into the rights of the Indian nations of America . . . Philadelphia, Aitken, 1781. Sometimes attributed to Dr. Franklin.

The following six volumes were formerly in the library of Benjamin Franklin:

- Bellegarde, J.B.M. de. *Modeles de conversations pour les personnes polies*. 4th ed. Amsterdam, Schelte, 1702.
- Crèvecoeur, M. G. St. J. de. *Letters d'un cultivateur américain . . . depuis l'année 1770, jusqu'à 1781*. Paris, Cuchet, 1784. 2 v.
- Horace. *Carmina*. Amsterdam, Janssonio-Waebergios, 1718.
- Lolme, J.L. de. *The constitution of England . . .* 4th ed. London, Robinson, 1784.
- Rozier, François. *Cours complet d'agriculture . . .* Paris, 1781-1786. 7 v.
- Valazé, C.E.D. de. *Loix pénales*. Alençon, Malassis, 1784.
- [Brizard, Gabriel.] *Fragment de Xénophon*. Paris, Pierres, 1783.
(An allegorical work in which Franklin is represented as Thales.)
- Desarnod. *Memoire sur les foyers économiques et salubres de M. le Docteur Franklin*. Lyon, Dessenne & Gattey . . . 1789.
- Francis et Decourcy. *Franklin à Passy . . . vaudeville anecdotique et un acte . . .* Paris, Chassaignon, 1832.
- Loge des Bons-Amis. [List of members in which Franklin's name appears] 1787.
- Pictorial life of Benjamin Franklin. Philadelphia, Lindsay and Blakiston, 1846.
- [Shillaber, B.P.] *A very brief and very comprehensive life of Ben: Franklin . . . done into quaint verse*. [Boston, 1856?] Broad-side.

In addition to the above manuscripts and books there were acquired a set of 413 brass stencils which Franklin had made and used in connection with his private press at Passy, 20 engravings, and six issues of English newspapers containing articles by or about Dr. Franklin, 1774-1791.

MANUSCRIPTS OTHER THAN FRANKLINIANA

- Barton, B.S. *Letters to Thomas Pennant, 1790-1794*. 17 mss. and 3 printed D's.
- Boas Collection. Additions made.
- Jefferson, Thomas. *Letter to Mathew Carey; Poplar Forest, Oct. [i.e. Nov.] 11, 1816*. A.L. 1 p.
- Patent issued to Cephas Thompson for a delineating machine . . . Feb. 5, 1806. Printed D.S: Th. Jefferson, President.
- Jennings, H.S. *Papers, consisting principally of manuscripts of lectures, published and unpublished, 1898-1945*. 152 items.
Presented by Mrs. Vernon Lynch
- Lukens, John. *Surveys of Philadelphia*. 12 items.
- Maclure, William. *Letters to Benjamin Silliman in the possession of Yale university library, 1817-1838*. 31 items. Microfilm.
- Manuscripts on Middle American cultural anthropology*. Ser. 1, no. 1-Ser. 3, no.20, 1946-1947. Microfilm.
Ser. 2, no.9-12 presented by A. V. Kidder
and the Carnegie Institution of Washington

Michaux, André and François André. Microfilms of material found in the French Archives. ca. 1500 frames.

Priestley, Joseph. Letters to various persons, 1774-1803. 11 items.

Reynell, John. Day book, July 1731-December 1732.

Presented by Seymour Adelman

Vaughan, Benjamin. Letters to John Vaughan, 1777-1819. 16 items.

Washington, George. Letter to Mr. [Thomas] Bradford; Newburgh, May 7, 1782. A.L.S. 1 p. and add.

Presented by the Fidelity-Philadelphia Trust Company

SELECTED PRINTED TITLES

Achenwall, Gottfried. Einige anmerkungen über Nord-Amerika und über dasige grosbrittannische colonien . . . Helmstedt, Kühnlin, 1777.

Ashley-Montagu, M.F. Studies and essays in the history of science and learning offered in homage to George Sarton . . . New York, Schuman [1946]

Bernhard, Karl. Travels through North America, during the years 1825 and 1826. Philadelphia, Carey, Lea & Carey, 1828.

Birkbeck, Morris. Notes on a journey in America. 4th ed. London, Ridgeway, 1818.

[Bonnet de Fréjus, J.E.] Réponse aux principales questions qui peuvent être faites sur les États-Unis. Lausanne, Luquiens, 1795. 2 v.

Brigham, C.S. History and bibliography of American newspapers, 1690-1820. Worcester, Mass., American Antiquarian Society, 1947. 2 v.

Buckingham, J.S. America, historical, statistic, and descriptive. London. Fisher [1841].

Buffon, G.L.L. comte de. Histoire naturelle . . . Paris, 1770-1789. 17 v.

Bumpus, H.C. Hermon Carey Bumpus, Yankee naturalist. Minneapolis, University of Minnesota Press [1947].

Chamberlain, L.H. The president, congress and legislation. New York, Columbia University Press, 1946.

Combe, George. Notes on the United States of North America, during a phrenological visit in 1838-39-40. Edinburgh, Mac-lachlan, Stewart, 1841. 3 v.

Fulton, J.F. Benjamin Silliman, 1779-1864. New York, Schuman, 1947.

Holbrook, S.H. The story of American railroads. New York, Crown, 1947.

Humphreys, W.J. Of me—W. J. Humphreys. Washington, 1947.
Presented by the author

Hussey, R.C. Historical geology; the geologic history of North America. 2nd ed. New York, McGraw-Hill, 1947.

Johnson, G.W. The first captain; the story of John Paul Jones. New York, Coward-McCann, 1947.

Jones, R.W. Journalism in the United States. New York, Dutton, 1947.

Kimball, M.G. Jefferson, war and peace, 1776-1784. New York, Coward-McCann, 1947.

Link, A.S. Wilson, the road to the White House. Princeton, Princeton University Press, 1947.

Martin, P.S. Indians before Columbus. Chicago, University of Chicago Press, 1947.

Mees, C.E.K. The path of science. New York, Wiley, 1946.

Presented by the author

Moreau de Saint-Méry, M.L.E. Moreau de St. Méry's American journey, 1793-1798, tr. and ed. by Kenneth Roberts and A. M. Roberts. Garden City, Doubleday, 1947.

Olmsted, J.M.D. Charles-Edouard Brown-Séquard . . . Baltimore, Johns Hopkins Press, 1946.

Oppenheimer, J.M. New aspects of John and William Hunter. New York, Schuman, 1946.

Priestley, Joseph. The history and present state of electricity. 3d ed. London, Bathurst & Lowndes, 1775.

Presented by Charles Coleman Sellers

— Lectures on history and general policy. London, Johnson, 1793. 2 v.

Presented by Charles Coleman Sellers

Sanderlin, W.S. The great national project; a history of the Chesapeake and Ohio canal. Baltimore, Johns Hopkins Press, 1946.

Thorp, Willard. The lives of eighteen from Princeton. Princeton, Princeton University Press, 1946.

Thursfield, R.E. Henry Barnard's American journal of education. Baltimore, Johns Hopkins Press, 1945.

Von Hagen, V.W. Maya explorer; John Lloyd Stephens and the lost cities of Central America and Yucatán. Norman, University of Oklahoma Press, 1947.

White, William. The common sense theology of Bishop White . . . ed. by S. A. Temple. New York, King's Crown Press, 1946.

Willis, Bailey. A Yanqui in Patagonia. Stanford, Stanford University Press, 1947.

Presented by the author

Winthrop, John. Two lectures on the parallax and distance of the sun, as deducible from the transit of Venus. Boston, Edes & Bill, 1769.

CABINET

Self portrait of Charles Willson Peale in the garb of a Revolutionary soldier. *Deposited by Charles Coleman Sellers*

Brass calendar made by Erasmus Habermel.

Presented by Lessing J. Rosenwald

Brass slide rule made by Franciscus Paduanus.

Presented by Lessing J. Rosenwald

These two scientific instruments were accompanied by a copy of Alfred Rohde's *Die geschichte der wissenschaften instrumente*, Leipzig, 1923, in which they are described.

Perpetual calendar.

Presented by Pierre S. du Pont

3. REPORT OF THE COMMITTEE ON MEETINGS

The Committee on Meetings for the year 1947-1948 consists of Thomas S. Gates, *President*, Luther P. Eisenhart, *Chairman*, Edwin G. Conklin, George W. Corner, Karl K. Darrow, Waldo G. Leland, Roy F. Nichols, Ernest M. Patterson, Bernadotte E. Schmitt, and Joseph H. Willits. During the year 1947 the Committee held four meetings, namely, on February 20, May 15, October 23, and December 18.

In accordance with the action taken by the Committee at its meeting on December 19, 1946, the first two days of the Annual General Meeting in 1947 were devoted to papers and the Executive Session was held on Saturday morning. The Penrose Lecture was given on Thursday evening, preceded by an informal dinner at the Benjamin Franklin Hotel which was open to all members of the Society. The annual dinner was held on Friday evening at the Bellevue-Stratford Hotel. There was general approval at the Executive Session in April 1947 of the change in the program schedule.

The Committee at its meeting on December 19 decided that there should be less emphasis on symposia and more on individual papers. In accordance with this proposal with the exception of four papers on oxygen on Friday afternoon, April 25, the rest of the program of the Annual General Meeting was devoted to individual papers.

For the Autumn General Meeting, November 20-21, members were invited to participate and papers were read by fourteen. The program of this meeting received general commendation. The same policy will be carried out in future meetings of the Society.

The Committee at its meeting on May 15 decided to hold a Midwinter Meeting in February, the program to be devoted to "Frontiers in Human Relations." Dr. Willits was appointed Chairman of the special committee, consisting of the following: Carl Hovland, Frederick Stephan, and Donald Young, to formulate a program. The program as submitted by this committee was approved by the Committee at its December meeting.

The Committee also voted that there be a symposium on international affairs at the Annual General Meeting in 1948 and the following committee was appointed to formulate this program:

Joseph H. Willits, *Chairman*, Hamilton Fish Armstrong, Carter Goodrich, William L. Langer, Philip C. Jessup, Waldo G. Leland, Frank W. Notestein, J. Robert Oppenheimer, and Jacob Viner.

At the December meeting the program on international affairs proposed by the special committee was adopted by the Committee on Meetings.

4. REPORT OF THE COMMITTEE ON PUBLICATIONS

The Committee on Publications for the year 1947-1948 consists of the following members: Jacob R. Schramm, *Chairman*, Luther P. Eisenhart, *Editor*, William B. Dinsmoor, Henry C. Lancaster, William E. Lingelbach, Ernest M. Patterson, Adolph H. Schultz, Robert L. Schuyler, George G. Simpson, Hugh S. Taylor, and Thomas S. Gates, *President*.

During the year 1947 four meetings of the Committee were held, namely on March 8, May 10, October 11, and December 13.

The Committee expresses its appreciation of the cooperation of members who have so generously returned upon request certain back issues of the PROCEEDINGS which were needed in order to complete certain volumes that are in demand. The Society is still interested in securing from members issues that they no longer desire to retain.

The revision of the exchange list, started in 1944, has been continued with special attention to foreign libraries. As shipping facilities to European countries have become available, consideration has been given of the libraries formerly on the mailing list; in some cases new libraries have been selected to receive PROCEEDINGS and YEAR BOOK without charge for three years, after which the question of whether or not they would continue to receive the Society's publications on a subscription basis would be taken up. In addition to the European libraries, a list is being drawn up of institutions in Latin America which should be placed on the regular exchange or on a temporary list for one year after consultation with persons familiar with the situation in Latin America. The following table indicates the number of foreign libraries receiving, or offered the publications of the Society without charge. Consideration is also being given to other countries formerly on the exchange list.

FOREIGN EXCHANGE LIST—DECEMBER 31, 1947

<i>Country</i>	PROCEEDINGS	TRANSACTIONS	YEAR BOOK	MEMOIRS
Africa	3		3	
Australia ...	5		5	
Austria	6*	1	6*	
Belgium	7	3	7	
Canada	3	1	3	
China	18*		18*	
Czechoslovakia	4*	1	4*	
Denmark ...	3	1	3	
Egypt	2*		2*	
England	16	5	17	2
Eire	1		1	
Finland	1	1	1	
France	33*	5	33*	1
Germany ...	43*	5	43*	
Greece	1*		1*	
India and Pakistan .	10*	1	10*	
Iran	1*		1*	
Italy	16*	7	16*	
Luxembourg .	1		1	
Netherlands .	8*	3	8*	
New Zealand .	1	1	1	
Norway	5*	1	5*	
Palestine ...	1*		1*	
Philippines .	1*		1*	
Poland	2*	1	2*	
Portugal	1		1	
Scotland	1	1	1	
Sweden	5	4	5	
Switzerland .	11*	2	11*	
Syria	1*		1*	
Turkey	2*		2*	
Yugoslavia .	1*		1*	

* Including some 3-year plan (in all, 65 libraries on 3-year plan list).

In response to a request for books from the American Book Center for War Devastated Libraries, an examination was made of the inventory of back copies of the PROCEEDINGS. It was felt that it might be more advantageous to send available copies direct to libraries which had been receiving them before the war rather than through the American Book Center. Consequently, a list was made up of the numbers of the PROCEEDINGS of which there were more than 150 copies in stock. This list was sent to all libraries on the exchange list, domestic as well as foreign, together with a letter offering those copies without charge. The same list was sent to libraries on the subscription list offering the copies at a 50 per cent discount. Requests for free copies have been received from 21 libraries (17 foreign, 4 domestic) and for copies at 50 per cent discount from 32 libraries (5 foreign, 27 domestic). Copies of numbers of the PROCEEDINGS of which there were more than 250 in stock were sent to the American Book Center.

It was found that there was in stock a large supply of certain volumes of the TRANSACTIONS in the field of vertebrate paleontology. Consequently, a notice was placed in the *News Bulletin* of the Society of Vertebrate Paleontology offering some of these at a reduced rate and others free.

During the war copies of all publications which could not be shipped abroad were stored as issued by the Lancaster Press. Because of the revision in the exchange list and the possibility of once again shipping publications to foreign countries, many of these publications have now been sent out. In the fall of 1947 space was found in the Society's building to store all the remaining TRANSACTIONS, MEMOIRS, and YEAR BOOKS held in Lancaster. It was therefore possible to make an inventory of these three publications and to have one made of the PROCEEDINGS still in storage in Lancaster.

A number of new subscriptions were received during the year. Circulars concerning recent publications have been mailed regularly to approximately eight hundred libraries in this country and letters have been written soliciting subscriptions to all libraries ordering individual copies. The following table gives a comparison in the mailing list before March 1, 1944, at which time the new policy was instituted of reducing exchanges and obtaining subscriptions, and at the end of 1947:

	Before March 1, 1944			December 31, 1947	
	Active	Inactive	Domestic	Foreign	Total
PROCEEDINGS :					
Subscriptions	60		225	47	272
Exchanges	176	368	48	172	220
TRANSACTIONS :					
Subscriptions	26		130	52	182
Exchanges	70	95	17	38	55
MEMOIRS :					
Subscriptions	10		67	6	73
Exchanges	71	95	1	3	4
YEAR BOOK :					
Subscriptions	1		37	9	46
Exchanges	176	368	54	173	227

The number of subscriptions and exchanges for the MEMOIRS is not indicative of the circulation; for example, the number of individual copies of the most recent volumes sold is given below:

Vol. 21, "Sumerian Mythology"	683
22, "Thomas Jefferson's Garden Book"	969
23, pt. 1, "Charles Willson Peale, I, Early Life"	103
23, pt. 2, "Charles Willson Peale, II, Later Life"	237
24, "Letters and Papers of Benjamin Franklin and Richard Jackson"	398

Sales of publications are continuing and a number of back sets have been supplied to institutions to complete their files. The demand for recent publications of the Society is increasing. The Publication Reserve Fund, which has been built up solely from sales of publications and subscriptions, at the beginning of 1947 amounted to \$25,430.90. From this an expenditure of \$23.36 was made for the preparation of plates for a Spanish edition of David Weinman's "Infectious Anemias due to Bartonella and Related Red Cell Parasites" to be published in Peru, and to it the receipts from the sale of publications during 1947 amounting to \$12,154.20 were added so that at the end of the year the Publication Reserve Fund amounted to \$37,561.74. A comparison of the receipts of 1947 with those of the previous five years is given below:

Year	Receipts	Year	Receipts
1942.....	\$1,390.44	1945.....	\$9,722.88
1943.....	5,533.33	1946.....	8,596.70
1944.....	10,111.32	1947.....	12,154.20

At the beginning of the year an appropriation of \$30,000 was made for publication purposes to which was added \$18,000 carried over from the previous year for specific commitments made in 1946 on which the work was not completed until 1947. From this \$48,000 expenditures were made amounting to \$17,292.19, leaving a balance of \$20,707.81 which, with the exception of sufficient funds to cover the concluding parts of the 1947 volume of the TRANSACTIONS and \$6,500 committed for Volume 36, viz. \$9,200, was reverted to principal.

The Committee was notified in October that the Lancaster Press had found it necessary to raise their prices again owing to the increase in the cost of labor and materials. Dr. Schramm made an analysis of their proposal with regard to the PROCEEDINGS which amounts to an over all increase of approximately 31 per cent above the previous prices and 58.6 per cent above the prices at the time of the adoption of the present format in 1941. The proposal was accepted to go into effect beginning with Volume 91, number 5 of the PROCEEDINGS and Volume 37, part 3 of the TRANSACTIONS.

The cost of direct advertising, not including postage and office expenses, was about \$200 which covered the printing and multilithing of circulars, and addressing of envelopes outside the office. Announcements of recent publications were sent to libraries, institutions, and individuals, and copies of every publication issued by the Society during the year were sent to appropriate journals for review. These expenses were charged to the Executive Office Expense Account.

During the year the Committee considered and accepted for publication manuscripts as follows:

In the PROCEEDINGS	34 papers
TRANSACTIONS	7 monographs
MEMOIRS	1 book

Nineteen manuscripts were declined.

A complete volume of the PROCEEDINGS, consisting of five numbers, and a complete volume of the TRANSACTIONS, in four parts, one of which, "Kwakiutl Grammar," was typewritten and lithographed by Edwards Brothers, were issued during the year and the contents are noted below. The volume of the TRANSACTIONS for 1946, the large monograph entitled "History of Chinese Society—Liao," was delayed further because of its complicated character

and length, and it was not possible to issue it during 1947. However, the work is now in the final stages and it is expected to appear before the middle of 1948.

Two new volumes of the MEMOIRS were issued during 1947, namely Volumes 23 and 24. The former is a biography in two parts of the artist, Charles Willson Peale, by Charles Coleman Sellers. Part 1 was originally published privately in 1939 by the author under the title *The Artist of the Revolution*. The bound edition of five hundred copies was exhausted but the author still had five hundred copies of the text in flat sheets which he gave to the Society. New copies of the collotype plates were made and bound with the text, a new preface and preliminary material were inserted, and this volume was reissued by the Society under the title "Charles Willson Peale, Vol. I, Early Life, 1741-1790." An entirely new manuscript written by Mr. Sellers was published by the Society as "Charles Willson Peale, Vol. II, Later Life, 1790-1827."

The correspondence between Benjamin Franklin and Richard Jackson, recently acquired by the Society's Library, edited and annotated by Carl Van Doren, was issued as Volume 24 of the MEMOIRS.

The offset edition of "Thomas Jefferson's Garden Book" which was authorized in 1946 was completed in September 1947. One thousand extra sets of collotype illustrations had been prepared with the original edition and were inserted in the proper places of the offset text.

Another volume of the MEMOIRS, "Sumerian Mythology," was out of print in May 1947 and an offset edition of five hundred copies was authorized. Because of the cost of reprinting the selling price was raised from \$2.00 to \$2.50.

At the May meeting of the Committee Dr. Eisenhart raised the question of whether or not it might be advantageous to the Society to enter into an agreement with the Princeton University Press to publish certain volumes of the MEMOIRS. Mr. Datus Smith, Director of the Press, was particularly interested in the manuscripts listed for future MEMOIRS, especially that by George W. Corner on "The Autobiography of Benjamin Rush." The matter was considered at length by the Committee and it was felt that the Society would benefit by the expert typographical work done by the Princeton Press and also in the matter of advertising and dis-

tribution. On June 25, 1947 a contract with the Princeton University Press was signed by which the Press agrees in general to publish for the Society any manuscript which the Society has accepted for publication in the MEMOIRS series; the Society agrees to purchase at 40 per cent discount from list price at least five hundred copies for sale and distribution and exchange. The report on this matter was accepted by the Council and the Society in Executive Session at the Autumn Meeting. Dr. Corner's manuscript is now in the hands of the Princeton University Press and will be issued as Volume 25 of the MEMOIRS.

Additional manuscripts in prospect for the MEMOIRS series are "Letters of Benjamin Rush" by L. H. Butterfield, "Thomas Jefferson's Farm Book" by E. M. Betts, "Correspondence of Benjamin Franklin and Catharine Ray Greene" by William G. Roelker, and the "Benjamin Franklin—Jane Mecom Correspondence" by Carl Van Doren.

It was decided not to include the complete LIBRARY BULLETIN in the YEAR BOOK for 1946 and that hereafter it should be issued as a separate publication.

At the October meeting of the Committee the question of the policy involved in the relationship between the meetings and the publications of the Society was discussed. It was agreed that, when a person had been specially invited to present a paper before one of the meetings of the Society, his paper should be published in the PROCEEDINGS without necessarily going through the formality, and delay, of approval by the Committee. The manuscript would go through the hands of the Editor who would have the authority to decide whether or not it was in the proper form for publication.

At the final meeting of the Committee, in December, the future policy with regard to the PROCEEDINGS was discussed. It was reported that during the last few years the trend in the volume of material published had been slightly downward. It was felt that steps should be taken to secure first class papers for publication in the PROCEEDINGS in addition to those read at meetings, and that the size of a volume could be nearly doubled with the funds available. The members of the Committee were requested to secure suitable manuscripts, and it was felt that the members of the Society should understand that the Society is in a position to publish high grade manuscripts in all fields regardless of length.

PUBLICATIONS OF THE AMERICAN PHILOSOPHICAL SOCIETY
DURING THE YEAR 1947

TRANSACTIONS:

Vol. 37, Pt. 1. March.

Henry P. Hansen. Postglacial Forest Succession, Climate, and Chronology in the Pacific Northwest. 130 pp., 114 figs., 2 maps.

Vol. 37, Pt. 2. May.

Joseph D. Coppock. The Food Stamp Plan. Moving Surplus Commodities with Special Purpose Money. 70 pp., 13 charts.

Vol. 37, Pt. 3. December.

Franz Boas. Kwakiutl Grammar with a Glossary of the Suffixes. Edited by Helene Boas Yampolsky with the collaboration of Zellig S. Harris. 177 pp.

Vol. 37, Pt. 4. December.

Julius E. Lips. Naskapi Law (Lake St. John and Lake Mistassini Bands). Law and Order in a Hunting Society. 114 pp., 19 figs.

PROCEEDINGS:

Vol. 91, No. 1. February.

Symposium of the American Philosophical Society on America's Role in the Growth of Science.

Edwin G. Conklin. The American Philosophical Society and International Relations. pp. 1-9.

Henry Norris Russell. America's Role in the Development of Astronomy. pp. 10-16.

Karl K. Darrow. Growth of the Physical Sciences and their Applications in the United States. pp. 17-21.

Liberty Hyde Bailey. Botanical Sciences and their Applications Including Agriculture. pp. 22-26.

Gilbert Chinard. Eighteenth Century Theories on America as a Human Habitat. pp. 27-57.

Richard Harrison Shryock. Trends in American Medical Research during the Nineteenth Century. pp. 58-63.

Pilgrim Trust Lecture of the National Academy of Sciences.

Sir Henry Hallett Dale. The Freedom of Science. pp. 64-72.

Symposium of the National Academy of Sciences on Present Trends and International Implications of Science.

Harlow Shapley. Astronomy and International Cooperation. pp. 73-74.

Harald Ulrik Sverdrup. New International Aspects of Oceanography. pp. 75-78.

James B. Macelwane, S.J. Geophysics. pp. 79-82.

Charles Kenneth Leith. Mineral Resources in their International Relations. pp. 83-87.

Thomas M. Rivers. Epidemic Diseases. pp. 88-94.

Elvin Charles Stakman. International Problems in Plant Disease Control. pp. 95-111, 17 figs.

William C. Rose. The Role of the Amino Acids in Human Nutrition. pp. 112-116.

Symposium of the National Academy of Sciences on Problems of International Cooperation in Science.

Alexander Wetmore. Publication and the Distribution of Publications. pp. 117-120.

John A. Fleming. The International Scientific Unions. pp. 121-125.

Jerome C. Hunsaker. International Scientific Congresses. pp. 126-128.

Robert A. Millikan. The Interchange of Men of Science. pp. 129-132.

W. Albert Noyes, Jr. The United Nations Educational, Scientific and Cultural Organization. pp. 133-136.

Vol. 91, No. 2. April.

Niels H. D. Bohr. Atomic Physics and International Cooperation. pp. 137-138.

V. K. Zworykin and L. E. Flory. An Electronic Reading Aid for the Blind. pp. 139-142, 6 figs.

Roy F. Nichols. American Democracy and the Civil War. pp. 143-149.

Donald Young. Techniques of Race Relations. pp. 150-161.

W. Norman Brown. India's Pakistan Issue. pp. 162-180.

Stuart Mudd. Recent Observations on Programs for Medicine and National Health in the USSR. pp. 181-188.

Fred L. Whipple. Photographic Meteor Studies. IV. The Geminid Shower. pp. 189-200, 4 figs.

Philip P. Wiener. The Peirce-Langley Correspondence and Peirce's Manuscript on Hume and the Laws of Nature. pp. 201-228, 2 figs.

Vol. 91, No. 3. August.

Duncan Stewart, Jr. Rocks of the Melchior Islands, Antarctica. pp. 229-233.

J. Percy Moore. William Maclure—Scientist and Humanitarian. pp. 234-249, 2 figs.

Eufrosina Dvoichenko-Markoff. Benjamin Franklin, the American Philosophical Society, and the Russian Academy of Science. pp. 250-257.

B. H. Putnam. Records of Courts of Common Law, Especially of the Sessions of the Justices of the Peace. Sources for the Economic History of England in the Fourteenth and Fifteenth Centuries. pp. 258-273.

Lessing J. Rosenwald. "What is it We Have Got to Solve? Are the Jews a State or are They a Religion?" pp. 274-280.

David Bruce Dill. Contributions of Physiology to Problems of Industry. pp. 281-283.

Robert F. Heizer. Petroglyphs from Southwestern Kodiak Island, Alaska. pp. 284-293, 6 figs.

Francis Biddle. The Nürnberg Trial (R. A. F. Penrose, Jr., Memorial Lecture). pp. 294-302.

Vol. 91, No. 4. October.

Arthur H. Compton. The Place of Science in the Program of UNESCO. pp. 303-306.

Rutherford E. Delmage. The American Idea of Progress, 1750-1800. pp. 307-314.

Charles P. Olivier. Long Enduring Meteor Trains. Second Paper. pp. 315-327, 11 figs.

S. Wilma Deierkauf-Holsboer. Vie d'Alexandre Hardy, Poète du Roi. pp. 328-404.

Vol. 91, No. 5. December.

Zechariah Chafee, Jr. Do Judges Make or Discover Law? pp. 405-420.

Gabriel Bonno. The Diffusion and Influence of Locke's *Essay Concerning Human Understanding* in France Before Voltaire's *Lettres Philosophiques*. pp. 421-425.

Herbert E. Bolton. The West Coast Corridor. pp. 426-429.

Ernst H. Krause. High Altitude Research with V-2 Rockets. pp. 430-446, 21 figs.

W. Eugene Hollon. Zebulon Montgomery Pike and the Wilkinson-Burr Conspiracy. pp. 447-456.

MEMOIRS

Vol. 23, Pt. 1. Charles Coleman Sellers. Charles Willson Peale, Vol. I, Early Life, 1741-1790. xiv, 293 pp., 26 figs.

Vol. 23, Pt. 2. Charles Coleman Sellers. Charles Willson Peale, Vol. II, Later Life, 1790-1827. xii, 468 pp., 45 figs.

Vol. 24. Carl Van Doren. Letters and Papers of Benjamin Franklin and Richard Jackson, 1753-1785. ix, 222 pp., 12 figs.

YEAR BOOK for 1946. 459 pp., 3 figs.

LIBRARY BULLETIN for 1946. 103 pp., 12 figs.

COST OF PUBLICATIONS ISSUED DURING 1947

TRANSACTIONS

Vol. 34, Part 2. Second printing from standing type, 224 copies	\$ 208.89
Vol. 37, Part 1. 130 pp., 114 figs., 2 maps. 539 copies..	1,735.19
Vol. 37, Part 2. 70 pp., 13 charts. 550 copies	731.49
Vol. 37, Part 3. 177 pp., offset. 516 copies	1,929.36
Vol. 37, Part 4. 114 pp., 19 figs. 604 copies	1,589.79

PROCEEDINGS

Vol. 89, No. 2. Second printing from standing type, 215 copies	208.05
Vol. 90, No. 3. Binding in cloth 55 copies, in paper 52 copies held in flat sheets	79.05
Vol. 91, No. 1. 136 pp., 17 figs. 1,549 copies	1,389.28
Vol. 91, No. 2. 92 pp., 12 figs. 1,221 copies	839.58
Vol. 91, No. 3. 74 pp., 8 figs. 1,239 copies	807.69
Vol. 91, No. 4. 102 pp., 11 figs. 1,270 copies	1,215.84
Vol. 91, No. 5. 54 pp., 21 figs. 1,237 copies	862.72
Reprints from Vol. 91 (50 of each article supplied by Society)	519.61

MEMOIRS

Vol. 20. Binding in cloth 201 copies held in flat sheets ..	202.90
Vol. 21. Second printing by offset, 21 collotype plates. 500 copies, cloth-bound	1,266.37
Vol. 22. Second printing by offset, collotype plates and jackets available from previous printing, 1,000 copies, cloth-bound	2,913.87
Vol. 23. Part 1. xiv, 293 pp., 26 figs. Printing preliminary pages (flat sheets of 479 copies of text supplied by author), 1,000 sets of 20 collotype plates, jackets. 479 copies, cloth bound.....	1,117.98
Vol. 23, Part 2. xii, 468 pp. 45 figs. (including 35 collotype plates), jackets. 1,507 copies: 1,007 cloth-bound, 500 flat sheets	4,016.73
Vol. 24. ix, 222 pp., 12 figs., jackets. 2,000 copies: 1,000 cloth-bound, 1,000 flat sheets	2,532.03

YEAR BOOK for 1946. 459 pp., 3 figs. 875 copies: 800 paper-bound, 75 cloth-bound	2,492.15
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Reprints: 25 copies Membership List, 250 copies Brief History	78.00
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Authors' reprints (research reports and obituaries)	158.67
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LIBRARY BULLETIN. 103 pp. 12 figs. 400 copies	832.35
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Authors' reprints	60.50
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5. REPORT OF THE COMMITTEE ON RESEARCH

The Laws (Chap. V, Art. 4) specify that the Committee on Research shall consist of the President, *ex officio*, and not fewer than six other members, representative of the four Classes, who shall be nominated by the President and elected by the Council. In practice it has been found desirable to have more than six elected members in order to obtain wider representation of subjects. While regular election to the Committee is for a term of three years, several persons so elected have found it necessary to resign and others have been appointed to fill out their terms. There is no provision in the Laws against the reelection of a person to serve on this Committee. Several members of the Committee have served for two or more terms and their experience has been of great and increasing value. All serve without compensation; actual expenses incurred in attending meetings are paid, as in the case of all other committees.

The members of the Committee for 1947-1948, the subjects they represent, and the dates of their last election are listed herewith:

Eisenhart, Luther P., *Chairman* (Mathematics), 1945
Albright, William F. (Archæology), 1945
Bronk, Detlev W. (Biophysics and Physiology), 1945
Carmichael, Leonard (Psychology), 1947
Chinard, Gilbert (Languages and History), 1947
Conklin, Edwin G. (Biology), 1945
Fetter, Frank A. (Political Economy), 1947
Goodrich, Carter (Economics), 1947
Robbins, William J. (Botany), 1946
Shapley, Harlow (Astronomy), 1945
Shryock, Richard H. (History), 1947
Swann, W. F. G. (Physics), 1947
Taylor, Hugh S. (Chemistry), 1945
Young, Donald R. (Sociology), 1946
Gates, Thomas S., *ex officio* (Affairs), 1945

There are three research funds in the keeping of the Society, the Penrose Fund which is unrestricted, the Johnson Fund which is partially restricted in that it has been agreed that persons working in certain institutions may be regarded as occupying a pre-

ferred position, and the Daland Fund which is restricted to research in clinical medicine.

The Committee has been charged with the distribution of research grants from all three of these funds and the same forms of application and methods of procedure are used in all cases.

The Committee held five meetings during the year 1947, namely on January 17, April 14, June 6, October 17, and December 19. Applications and supporting letters are manifolded and sent to the members of the Committee about ten days in advance of the meeting; in many cases members consult by correspondence or in person with applicants, or with persons conversant with the applicants or their projects.

The Committee decided several years ago that apparatus and materials of lasting value that have been purchased from the research funds should be marked with metal tags reading: "Property of the American Philosophical Society, Philadelphia," and should be subject to recall when the project for which they were purchased had been fulfilled. The Committee has been receiving applications for apparatus and materials similar to that already on loan. In order to meet such applications, the Committee recently voted to request the return of such items after the expiration of the period named in the application as the probable duration of the research, unless granted an extension. A list of items follows:

Apparatus on loan

Equipment for aluminizing mirrors in optical train.

Regional spectrophotometer, direct vision hand spectroscope, thermostat for rapid reaction device.

High precision graduated circle with accompanying microscopes.

2 thermionic DC amplifiers, galvanometer.

Permanent magnet for construction of beta-ray spectrograph.

10 milligrams radium-beryllium neutron source.

Warburg respirometer.

2 densitometers.

Dionic water tester.

Libby photoneutron reflectometer.

Colorimeter.

High angle centrifuge.

Spencer research microscope.

Photoelectric colorimeter.

Victoreen condenser-type r-meter with a 25-r chamber, 100-r chamber tube and chamber.

Amplifiers and recording system for encephalography.

Oscillograph.

Equipment for measuring alpha particles, and photographic alpha particle recorder.

Constant temperature incubator, research microscope.

4 Beckman spectrophotometers.

Barcroft-Warburg bath and six Summerson manometers and respirometer vessels.

Refrigerated high speed centrifuge.

Converter to operate recorder off car generator.

Flame photometer and accessories.

Ultraviolet spectrophotometer, torsion balance.

3-channel brain wave amplifiers.

Leeds and Northrup potentiometer, galvanometer, Lane-Nims microvoltmeter.

Photoelectric colorimeter.

Precision potentiometer unit.

Vacuum line cathetometer and special dissociation equipment.

Beckman quartz spectrophotometer Model DU, with ultraviolet accessory and equipment.

Esterline-Angus graphic recorder, Dumont type 215 linear time base generator, and components for Fourier transform computer.

Electronic equipment.

Phase contrast microscope.

Apparatus returned—in possession of the Society.

Thermograph, hygograph.

Taylor Instrument Company dermatom.

Micro-manipulator.

The following general principles have been adopted by the Committee:

1. Grants are made only for the promotion of research and chiefly in the fields represented by the membership of the Society.

2. Grants are not made to pay salaries in whole or in part of members of the staff of an educational or scientific institution. It is expected that an institution will cooperate by furnishing at least general laboratory, library, and office facilities for those engaged in the investigation.

3. Grants are not given for fellowships, or scholarships, nor for work on doctoral theses. They are not given for usual or permanent equipment of the institution involved. Apparatus of permanent value purchased by means of a grant shall become the property of the Society, for such disposition as the Society may determine when the purpose for which it was purchased has been fulfilled.

4. Projects, methods of procedure, places where the work is to be done, and any cooperation of the institution where the research

is to be conducted and of other institutions or agencies should be clearly stated.

5. Preference will be given to the support of investigations which are already well begun and in which definite results can be expected with the aid of the grant. Projects requiring long continued support cannot in general be assisted.

6. Any publication of work supported in whole or in part by a grant from this fund shall state in connection with the title that the work was supported by a grant from the particular fund of the American Philosophical Society from which the grant was made, and a copy of such publication shall be sent to the Society.

7. As a general policy the funds allocated to each project will be disbursed quarterly by the Society to those in charge, unless the nature of the work requires a different arrangement.

8. Reports of expenditures from grants are expected semi-annually, and a report of progress shall be made by the grantee to the Committee on Research annually. A summary of the work shall be presented to the Society for publication in its YEAR BOOK when that part of the work for which the grant was made is completed.

9. No recipient of a grant thereby becomes an employee of the Society.

The Committee recommended to the Committee on Finance when preparing the Budget for 1947 that balances at the close of 1946 in the Penrose, Johnson, and Daland Funds be no longer added to the Reserve Fund for Post War Expenditures established in 1943, but that such balances be added to Principal, and reported the same to the Council. The Council, however, at its meeting on October 17 voted that all balances in excess of commitments at the end of the year be added to Principal of the funds with the understanding that funds so added to Principal shall be subject to withdrawal by action of the Council.

THE PENROSE FUND

The budget for 1947 assigned \$71,500 from the income of the Penrose Fund for the support of research. A balance of \$7,129.91 was carried over from 1947 of which \$125 was credited to a recipient's account. To the sum of \$71,500 were added the balance of \$7,004.91 and refunds and cancellations amounting to \$4,615.61 so that a total of \$83,120.52 was available for grants during the

year. The following 89 grants were awarded totalling \$80,103.05, plus two conditional grants totalling \$2,500, leaving a balance of \$517.47 which has been transferred to Principal.

Grant No. 917. Louise Beck, Bryn Mawr, Pa. Maintenance, travel, for the completion of the transcription—music and text—of the songs contained in the XIIIth century Ms. "Le Manuscrit du Roi," and the preparation of this material for publication.....	\$300
Grant No. 917a. Louise Beck, Bryn Mawr, Pa. Extension of grant No. 917 for another six months	600
Grant No. 918. Anne Bezanson, University of Pennsylvania. Assistance and travel for the completion of a study of prices in Philadelphia during the period of the American Revolution.....	2,000
Grant No. 919. Hugh O'Neill Hencken, American School of Prehistoric Research. Supplies, travel, maintenance to investigate the prehistoric archæology of the Tangier area of Morocco	3,120
Grant No. 920. C. T. Hurst, Western State College. Assistants and field travel in connection with the study of prehistoric Indian remains in western Colorado. (Second grant.).....	350
Grant No. 921. Ernst Levy, University of Washington Law School. Travel and maintenance to complete Volume I of book "West Roman Vulgar Law" and to gather material not available here for the one or several volumes to follow	1,500
Grant No. 922. Oscar Lewis, Washington University. Informant fees, assistance, etc. to complete a combined culture and personality study of the Mexican village of Tepoztlan	500
Grant No. 923. Willem J. Luyten, University of Minnesota. Student assistants in connection with the measurement of the proper motions of 26000 stars in the southern hemisphere between declinations —40 and —20. (Second grant.).....	1,000
Grant No. 924. Kemp Malone, Johns Hopkins University. Travel to Denmark, maintenance for the Variorum edition of the Old English epic poem <i>Beowulf</i>	1,000
Grant No. 925. Albert D. Menut, Syracuse University. Secretarial assistance, travel, etc. for the preparation of a critical edition of the first French translation with commentary of Aristotle's Politics and the pseudo-Aristotelian Economics, made for Charles V of France by Nicole Oresme in 1374	1,000
Grant No. 926. Arthur D. Nock, Harvard University. Assistance for the preparation of the third volume of the edition of the Hermetica being published by the Association Guillaume Budé under the editorship of Fr. A. J. Festugière, O.P. of the École des Hautes Etudes, and Dr. Nock	300
Grant No. 927. William G. Sawitz, Jefferson Medical College. Animals and care thereof, for the establishment of a reliable, practicable procedure for the early diagnosis of trichinosis.....	500
Grant No. 928. Robert M. Tatum, U. S. Naval Academy. Charts, maps, travel, etc. to locate all petroglyphs possible in the United States	

and to study their areal distribution as well as that of typical designs, and to determine the value of petroglyphs to the archaeologist in the study of cultural relationship.....	\$100
Grant No. 929. Charles de Tolnay, Institute for Advanced Study. Ocean travel, field work in connection with the completion of Volume IV of Michelangelo: reconstruction of the different versions of the Tomb of Julius II, the history and interpretation of the Last Judgment and of the late sculptures of Michelangelo	800
Grant No. 930. Seymour Wapner, Brooklyn College. Animals, food assistance, apparatus for an analysis of the dynamics underlying equivalence reactions of the rat based upon a learned discrimination	400
Grant No. 931. Lloyd R. Watson, Alfred University. Assistants, supplies, photographic material, etc. for the instrumental insemination of queen bees. (Fourth grant.)	950
Grant No. 932. Chandler B. Beall, University of Oregon. Assistant for research and secretarial aid for a study of the influence, vogue and critical reception of the works of Torquato Tasso in England..	500
Grant No. 933. Edmund K. Hall, University of Louisville. Animals for an analysis of the factors involved in the differentiation of the nervous system in embryos and fetuses of a mammalian form (white rat)	100
Grant No. 934. William R. Hogan, University of Oklahoma. Field work, travel, etc. to edit the diary of William T. Johnson, a Natchez free Negro, 1835-1855	1,000
Grant No. 935. John J. Honigmann, State College of Washington. Informants and interpreters for the study of the Nez Perce Indian Reserve in Idaho.....	400 ¹
Grant No. 936. Earl L. Griggs, University of Pennsylvania. Travel to and from England, photostats, etc. for the preparation of an edition of the complete correspondence of Samuel Taylor Coleridge	1,200
Grant No. 937. J. Logan Irvin and Elinor Moore Irvin, Johns Hopkins School of Medicine. Equipment for the spectrophotometric and potentiometric evaluation of apparent ionization constants of certain drugs	1,750
Grant No. 938. William Stanford Reid, McGill University. To supplement previous grant for the preparation of a biography of Robert Barton. (Second grant.)	200
Grant No. 939. Wallace E. Stegner, Stanford University. Microfilms in connection with the preparation of a biography of Major John Wesley Powell, explorer, government planner, and founder of several of the scientific bureaus of the federal government. (Second grant.)	50
Grant No. 940. Mary R. Haas, University of California. Typist to make copies of a large body of notes on the Natchez and Creek (Muskogee) languages collected between 1934 and 1940. (Second grant.)	350

¹ Relinquished.

Grant No. 941. George L. Trager, University of Oklahoma. Informants, travel, in connection with the field work on the Tanoan languages of the Tiwa sub-family, spoken at the pueblos of Taos, Picuris, Sandia, and Isleta in New Mexico, for the purpose of collecting sufficient data to complete work on Taos and write a definitive grammar	\$500
Grant No. 942. Stevenson Smith, University of Washington. Travel and maintenance for a study of the racial differences in the Hawaiian area	1,000
Grant No. 943. Walter H. Rubsamen, University of California. Travel in connection with the study of the music of the Ballad operas in the American Colonies and England during the 18th century.....	500
Grant No. 944. Henry P. Hansen, Oregon State College. Travel for a study of postglacial forest migrations and climate in western Canada	1,500
Grant No. 945. Victor F. Hess, Fordham University. Field work for a further study of the actual ionization produced by the gamma rays from well analyzed types of rocks. (Fourth grant.).....	900
Grant No. 946. Fiske Kimball, Philadelphia Museum of Art. Travel, photostats, photographs, etc. for a study of the creative figures in French Architecture under Louis XIV.....	1,000
Grant No. 947. Theodore C. Schneirla, American Museum of Natural History. Travel and field expense of Dr. Enzmann to study the behavior pattern of army ants in relation to underlying ecological and physiological conditions, through a period of major seasonal changes	650
Grant No. 948. Charles Coleman Sellers, Hebron, Conn. Living and travel expenses, photographs, etc. for a survey of Charles Willson Peale's work as an artist. (Library Research Associate. Fourth grant.)	2,500
Grant No. 949. Carl Van Doren, New York. Assistance for a critical edition of the correspondence of Benjamin Franklin and his sister Jane Franklin Mecom. (Library Research Associate. Second grant.)	1,500
Grant No. 950. Horst W. Janson, Washington University. Travel expenses, photographs, etc., for an inquiry into the role of apes and monkeys in the civilization of the middle ages and renaissance in western Europe	650
Grant No. 951. George M. Kahrl, Elmira College. Research assistant, travel, etc. to complete the collecting and editing for publication of the letters of David Garrick (1717-1779).....	2,500
Grant No. 952. George L. Kreezer, Institute for Advanced Study. Equipment for the development of methods for determination of the components of biological systems on the basis of the mathematical analysis of transient response curves.....	690
Grant No. 953. John C. Lapp, Bucknell University. Prints or photostats to be made in the American Philosophical Society Library from his microfilms for a critical edition of the Discours Philosophiques Pontus de Tyard.....	96.25

Grant No. 954. David H. Raab, Brooklyn College. Equipment, supplies, animals and feed supplies for an investigation of previous experiments dealing with the neurology of hearing and auditory learning in animals	\$1,000
Grant No. 955. Helen Wright, Washington, D. C. Travel in connection with the preparation of a biography of George Ellery Hale.....	1,000
Grant No. 956. Sten G. Flygt, Princeton University. Travel, to study modern Swedish life and culture.....	500 ²
Grant No. 957. Adolf Berger, École Libre des Hautes Études, N. Y. Maintenance, to complete the encyclopedical Dictionary of Roman Law. (Second grant.)	1,500
Grant No. 958. Oscar Jászi, Oberlin College. Travelling expenses and secretarial work for the preparation of an essay, a series of articles, or a book on the fundamental changes which have occurred in the Danubian region	2,000
Grant No. 959. Anne Louise Hastings, Wellesley College. Maintenance, travel, typing and preparation of the manuscript of a biography of Mary Moody Emerson	750
Grant No. 960. Vernam Hull, New York University. Travel and living expenses for the completion of a critical edition of the Irish tale entitled "The Exile of the Sons of Uisliu".....	800
Grant No. 961. Lewis H. Kleinholz, Reed College. Assistant, animals, glassware, etc. for a study of the endocrine and nervous factors in the regulation of hyperglycemia in crustaceans.....	890
Grant No. 962. Thomas A. Stephenson, University of Miami. Travel, food, equipment for a study of the general biology of animals and seaweeds between tidemarks	500
Grant No. 963. L. Reed Brantley, Occidental College. Equipment and assistants for the investigation of the acidic and oxidizing properties of oxygen fluoride, and related compounds prepared from elemental fluorine, in aqueous solutions and in the gaseous state...	650
Grant No. 964. Ching-tsoo Wei, University of Nanking. Assistant, supplies, travel, in connection with (1) a survey of the seed borne pathogens of soybean in North and Central China; (2) a study on the relative effectiveness of treatments with organic mercury dusts and hot water	1,500
Grant No. 965. Edward Dumbauld, Washington, D. C. Microfilms for the preparation of a monograph on "Thomas Jefferson and the Law"	150
Grant No. 966. E. Dvoichenko-Markoff, New School for Social Research. Travel expenses, photostats, assistants, translations for work pertaining to relations between the American Philosophical Society and Russia from the XVIIIth century to the present time. (Third and final grant.).....	1,000
Grant No. 967. Walter Galenson, Harvard University. Travel, assistant and living expenses to complete his investigations of labor relations in Norway.	1,000

² Relinquished.

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Grant No. 968. W. Sherman Savage, Lincoln University. Travel, living in the field, etc. for a study of the Negro in the history of the West since 1890. (Second grant.)	\$500
Grant No. 969. Thomas Whittemore, The Byzantine Institute, Boston. Continuation of the work on the conservation and the uncovering of Mosaics in the churches of: the Chora Monastery, S. S. Sergius and Bacchus, St. Mary Pammakaristos—Istanbul. (Second grant.)	1,000
Grant No. 970. Leslie Spier, University of New Mexico. Field work and travel for ethnological studies among the southern Ute Indians of Colorado-Utah with a view to isolating determinants of the historical development of their culture, and the character of integration that takes place in culture elements in this, one of the "simplest" cultures of North American Indians.....	250
Grant No. 971. Edith Porada, Iranian Institute, N. Y. Maintenance for a study of ancient Near Eastern stamp seals in North American collections. (Third and final grant.).....	1,200
Grant No. 972. Karl J. Geiringer, Massachusetts. Microfilms, travel, assistance for the continuation of his study of Joseph Haydn's arrangements of Scottish and Welsh songs. (Second and final grant.)	600
Grant No. 973. Waldo S. Glock, Texas Technological College. Transportation, sampling, maintenance, etc. in connection with the investigation of the basic principles of tree growth and climate.....	512
Grant No. 974. Charles C. Griffin, Vassar College. Travel, copying and photographing documentary materials, etc. for a study of sea power in relation to the war of independence in Colombia (1810-24)	1,000
Grant No. 975. George G. Lower, Westtown, Pa. Maintenance and supplies to film in color the work and marine life at the Biological Station of Bermuda, and the Marine Biological Laboratory, Woods Hole, Mass.	904.80
Grant No. 976. Shepard B. Clough, Columbia University. Assistants, typing and editing in connection with the preparation of a study on the economic history of the factors of production primarily in the European-American scene	2,500
Grant No. 977. André B. Delattre, University of Pennsylvania. Microfilm reproductions of all accessible manuscripts of Voltaire letters, as a preliminary step toward a new edition of his general correspondence	500
Grant No. 978. David L. Dowd, University of Nebraska. Travel to Paris to complete and check the documentation of a work entitled <i>Art as Propaganda in the French Revolution: A Study of Jacques-Louis David</i> for a definitive biography of David.....	500
Grant No. 979. Colin Stevenson Pittendrigh, Columbia University. Field work, etc. for an investigation of the microclimatic divergence of the two very closely related species, <i>Drosophila pseudoobscura</i> and <i>D. persimilis</i>	400

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Grant No. 980. Bertha Solis-Cohen, Philadelphia. Personal research, any necessary equipment or typing in connection with the survey of the American Philosophical Society's activities in the Arctic Region	\$500
Grant No. 981. L. J. Wells, University of Minnesota. Technician and animal caretaker in connection with the investigation to determine whether the testes and the hypophysis of the unborn produce hormones that influence the prenatal development of related glands	1,400
Grant No. 982. Ernest R. Hilgard, Stanford University. Apparatus and supplies, technical assistance in connection with the study of the individual differences in discriminatory conditioning in relation to personality variable	500
Grant No. 983. Abraham M. Shanes, Bermuda Biological Station. Construction of necessary equipment for a study of the metabolic and ionic factors concerned with the action potential of nerve....	300
Grant No. 984. José V. Santos, University of the Philippines. Equipment and books, assistants and travel expenses in connection with the preparation of a Manual of Philippine Grasses.....	1,000
Grant No. 985. Gregorio Velasquez, University of the Philippines. Equipment, assistants, travel, etc. in connection with the survey of the algae and economic algal resources of the Philippine Islands	1,000
Grant No. 986. Hui-Lin Li, Soochow University. Equipment, assistant, field work and travel in connection with the taxonomic study of the family Scrophulariaceae of China and adjacent regions. (Second grant.)	1,500
Grant No. 987. Paul A. Wallace, Lebanon Valley College. Contribution toward the preparation of the history of the Muhlenberg family	1,500
Grant No. 988. Alfred Frederick Bliss, Tufts College Medical School. Equipment and animals for further studies on visual systems (Third grant.)	300
Grant No. 989. Jean Clark Dan, Milford, Conn. Apparatus in connection with the investigation on the problem of the mechanism of cell division in collaboration with Katsuma Dan.....	1,200
Grant No. 990. Bernard O. Dodge, New York Botanical Garden. Assistant for a study of the dominant lethal gene complex in <i>Neurospora tetrasperma</i>	1,200
Grant No. 991. Harald Erikson, Swarthmore College. Field work and transportation in connection with the investigation of the role of the rete mirabile in some diving mammals (especially whales) correlated with the physiology of their circulation and respiration.....	660
Grant No. 992. William M. Ingram, Mills College. Travel and preparation of illustrations for "The Land Snails and Slugs of the San Francisco Bay Area"	250

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Grant No. 993. John I. Kolehmainen, Heidelberg College. Maintenance in connection with the completion of his manuscript on "A History of the Finnish People in America."	\$750
Grant No. 994. Charles S. Singleton, Johns Hopkins University. Assistance for the preparation of a critical edition of Giovanni Boccaccio's <i>Decameron</i> . (Second grant.)	450
Grant No. 995. Fritz Machlup, Johns Hopkins University. Assistance and typist in connection with the preparation of a manuscript on "The Economics of the Patent System".....	825
Grant No. 996. Clarence T. Hurst, Western State College. Assistants, employed help, travel, etc., in connection with the excavations in central Montrose County, Colorado. (Third grant.).....	350
Grant No. 997. George W. Kyte, Lehigh University. Travel to London, etc., in connection with the study of Anglo-American relations at the time when the United States was engaged in an undeclared naval war with France	600
Grant No. 998. Edgar Anderson, Missouri Botanical Garden. Assistant, travel, in connection with the investigation of a comprehensive collection of exotic maize. (Third and final grant.).....	1,050
Grant No. 999. Clarence C. Hulley, University of Alaska. Travel to Great Britain and France in connection with the study of the career of Marie de Guise, Queen Regent of Scotland, and mother of Mary Stuart	500
Grant No. 1000. Richard B. Morris, Columbia University. Travel, assistance, micro-films in connection with the completion of the study of the convergence of freedom and bondage in the ante-bellum period of American History. (Second grant.).....	2,500
Grant No. 1001. E. Franklin Frazier, Howard University. Maintenance in connection with the investigation to discover the various patterns of the race relations that have grown out of the interaction of whites and negroes and their relation to the processes of acculturation and assimilation in the Caribbean area.....	2,500
Grant No. 1002. Sidney I. Pomerantz, City College of New York. Travel and other research expenses in connection with a study of the role of the Patriot press during the War for Independence....	225
Grant No. 1003. N. J. Berrill, McGill University. Assistants (part-time) and field work in connection with the comparative and experimental analysis of polymorphism in the coelenterate Hydrozoa and Scyphozoa	280
Grant No. 1004. Wolfgang Köhler, Swarthmore College. Amplifying and recording systems, accessories in connection with the investigation to determine whether the functions of ganglionic tissue particularly those of the human cortex are restricted to rhythmic phenomena	1,700

The distribution of these grants to various subjects is shown in the following table:

		Grants	Amount
Class I.	Astronomy	1	\$1,000
	Physics	1	900
	Chemistry	1	650
Class II.	Zoology	9	5,964.80
	Cytology	1	1,200
	Ecology	1	400
	Botany	8	9,262
	Anthropology	1	400
	Psychology	6	5,250
	Physiology	2	960
	Biochemistry	2	2,050
	Pathology	1	500
Class III.	History	13	13,125
	Political Science	1	2,000
	Economics	4	6,325
	Sociology	1	2,500
	Jurisprudence	3	3,150
Class IV.	History, Ancient, Cultural, and Literary..	17	12,796.25
	Archæology	5	5,120
	Ethnology	1	250
	Philology and Linguistics	3	1,350
	Music	3	1,500
	Art	4	3,450
Total		89	\$80,103.50

A summary of the research grants from the Penrose Fund made since the beginning of the Society's research program in midsummer of 1933 is shown in the following table:

SUMMARY OF GRANTS AWARDED FROM THE PENROSE FUND

From July 31, 1933 to December 31, 1947

	Grants	Amount	Refunds	Total
Class I. Mathematics.....	8	\$ 5,436.00		\$ 5,436.00
Astronomy and Astrophysics.....	40	40,190.00	\$ 1,548.11	38,641.89
Meteorology.....	4	2,232.00	21.75	2,210.25
Physics.....	78	79,132.53	3,738.95	75,393.58
Geophysics.....	3	4,200.00		4,200.00
Chemistry and Geochemistry.....	56	48,350.00	2,719.77	45,630.23
Engineering.....	1	75.00		75.00
Total.....	190	179,615.53	8,028.58	171,586.95
Class II. Geology.....	11	5,305.00	4,000.00	1,305.00
Paleontology.....	18	10,575.00		10,575.00
Geography and Physiography.....	3	1,200.00		1,200.00
Zoology.....	111	74,347.53	969.82	73,377.71
Genetics and Cytology.....	62	53,639.00	1,035.36	52,603.64
Ecology, Limnology, and Oceanography	20	12,162.50	230.75	11,931.75
Botany.....	77	59,363.71	1,624.69	57,739.02
Dendrochronology..	1	500.00		500.00
Bacteriology.....	7	3,450.00		3,450.00
Anthropology.....	22	26,285.00	2,846.14	23,438.86
Psychology.....	34	22,190.00	1,591.75	20,598.25
Anatomy.....	19	10,475.00	474.19	10,000.81
Physiology.....	74	60,362.00	1,102.54	59,259.46
Biochemistry.....	7	5,190.00		5,190.00
Pathology, Medicine, and Immunology .	15	10,900.00	249.06	10,650.94
Total.....	481	355,944.74	14,124.30	341,820.44
Class III. History, American and Modern.....	67	61,287.00	2,051.92	59,235.08
Political Science and Government.....	9	17,360.00	359.31	17,000.69
Economics.....	6	6,925.00		6,925.00
Sociology.....	6	6,325.00		6,325.00
Jurisprudence.....	6	6,950.00		6,950.00
Total.....	94	98,847.00	2,411.23	96,435.77

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SUMMARY OF GRANTS AWARDED FROM THE PENROSE FUND—*Continued*

	Grants	Amount	Refunds	Total
Class IV. Philosophy and Education.....	10	8,500.00	1,100.00	7,400.00
History, Ancient Medieval and Cultural	65	44,109.25	3,249.28	40,859.97
History of Science...	4	2,160.00		2,160.00
Archaeology.....	45	50,695.00	7,144.53	43,550.47
Ethnology.....	17	14,600.00	500.00	14,100.00
Philology and Languages.....	41	38,525.00	42.27	38,482.73
Literature.....	17	24,150.00	750.00	23,400.00
Drama.....	2	1,000.00		1,000.00
Music.....	16	10,270.00	381.38	9,888.62
Art.	13	10,600.00		10,600.00
Architecture.....	4	3,580.00		3,580.00
Total.....	234	208,189.25	13,167.46	195,021.79
MISCELLANEOUS.....	20	41,750.00	9.45	41,740.55
TOTAL.....	1,019	\$884,346.52	\$37,741.02	\$846,605.50
Total appropriations July 1933 to December 31, 1947			\$981,500.00	
Refunds and cancelled grants.....			37,741.02	\$1,019,241.02
Total grants July 1933 to December 31, 1947.....			884,346.52	
2 tentative commitments.....			2,500.00	
Credited to recipient instead of Penrose Fund.....			125.00	
Expenses 1933-1936*.....			247.96	
Transferred to the Committee on Library 1943.....			20,000.00	
Transferred to "Reserve Fund for Post-War Expenditures" to December 31, 1946.....			111,504.07	1,018,723.55
Balance on hand December 31, 1947.....				\$ 517.47

* After this date a separate fund was established for research expenses.

THE JOHNSON FUND

The budget for the year 1947 assigned the sum of \$22,000 for research from the income of the Eldridge Reeves Johnson Fund. A balance of \$1,000 was carried over from 1946. To the sum of \$23,000 was added one refund amounting to \$1,000, making a total of \$24,000 available for grants during the year. From this sum the following nine grants amounting to \$8,300 were approved leaving a balance of \$15,700 which has been transferred to Principal.

Grant No. 72. Francis W. Pennell, Academy of Natural Sciences of Philadelphia. Equipment, transportation, assistance for a taxonomic and geographic study of the Scrophulariaceae of Mexico. (Third grant.)	\$1,000*
Grant No. 73. Samuel Noah Kramer, University Museum, University of Pennsylvania. Assistant to catalogue the uncatalogued tablets in the University Museum Nippur Collection. (Second grant.)....	1,000
Grant No. 74. George R. Proctor, Academy of Natural Sciences of Philadelphia. Travel expenses and equipment for an ecological study of a group of ferns <i>Dryopteris cristata</i> and its relatives in eastern United States	200
Grant No. 75. H. Radclyffe Roberts, Academy of Natural Sciences of Philadelphia. Assistant for a study of closely related subspecies of grasshoppers by hybridization with morphological, cytological, and serological methods used. (Fourth grant.).....	300
Grant No. 76. Charles B. Wurtz, Academy of Natural Sciences of Philadelphia. Travel and field work in connection with the investigation of the factors concerned in the ecology and distribution of the molluscan fauna of the limestone coves, or fensters, of eastern Tennessee	200
Grant No. 77. J. Alden Mason, University Museum, University of Pennsylvania. Publication of "The Languages of the Papago of Arizona."	1,500
Grant No. 78. Francis W. Pennell, Academy of Natural Sciences of Philadelphia. Travel to and from Peru, field expenses, equipment in connection with the taxonomic and geographic study of the Scrophulariaceae of Peru. (Third grant.).....	1,400
Grant No. 79. Ruth Patrick, Academy of Natural Sciences of Philadelphia. Equipment, chemicals, technical help to study the chemical and physical properties of the water in which diatoms live in order to know the factors involved in their distribution. (Third grant.)	1,000
Grant No. 80. Academy of Natural Sciences of Philadelphia. Assistant to catalogue adequately the geological section of the Library..	1,700

THE DALAND FUND

The appropriation from the income of the Judson Daland Fund for Research in Clinical Medicine at the beginning of the year 1947 was \$8,500. No grants from this Fund have been made during the year and the \$8,500 has been transferred to Principal.

RESERVE FUND FOR POST-WAR EXPENDITURES

This Fund was established in 1943 from unexpended balances in the allotments from the Penrose, Johnson, and Daland Funds. It was added to in the same manner with the balances in 1944 and 1945. The Committee on Research may make grants from this

* Relinquished.

Fund and any other use of it requires action of the Council. The Fund at the beginning of the year amounted to \$166,446.92. From this sum the following twenty-two grants were approved amounting to \$46,610; in addition, two commitments totalling \$5,300 have been made but have not yet been executed, leaving a balance of \$124,536.62 which has been carried over to 1948.

Grant No. 4. College of Physicians, Philadelphia. To aid the College in paying for the first shipment of foreign journals and those now held by a firm in Holland for the Library of the College	\$3,000
Grant No. 5. Frederick Johnson, Robert S. Peabody Foundation for Archaeology. Wages, assistants, field work, equipment, etc., in connection with the archæological, botanical, and geological expedition to the Southwestern Yukon	4,700
Grant No. 6. C. L. Camp, Museum of Paleontology, University of California. Hiring of laborers in connection with the excavation and study of fossil mammals, particularly australopithecine apes ("man apes"), from caves of South Africa	2,000
Grant No. 7. R. von Koenigswald, American Museum of Natural History. Maintenance. To complete study of specimens collected in Java of <i>Pithecanthropus erectus</i> and <i>P. robustus</i>	2,400
Grant No. 8. Sigma Xi, Dr. George A. Baitsell, Secretary. To investigate, in the interest of all grants-in-aid committees, the needs and and the appropriate size of grants to assist in scientific research in the colleges and universities of the United States.....	5,000
Grant No. 9. Sumner McK. Crosby, Yale University. Excavations, labor, materials, etc., in connection with the excavations in the interior of the twelfth-century Abbey Church of St.-Denis, France..	2,000
Grant No. 10. Donald P. Costello, University of North Carolina. Assistant, travel, supplies, etc., in connection with the investigation of natural and induced heteroploidy in <i>Triturus torosus</i> and <i>Triturus rivularis</i> , two species of California salamanders	1,500
Grant No. 11. Mount Desert Island Biological Laboratory, Salisbury Cove, Maine. To provide apparatus for the Laboratory	3,000
Grant No. 12. Dashu Nie, University of Pennsylvania. Maintenance, for a study of host-parasite relations between the guinea-pig and its intestinal Protozoa	750
Grant No. 13. Subrahmanyan Chandrasekhar, Yerkes Observatory, University of Chicago. Travel, use of mechanical computers, etc., in connection with (a) tabulation of exact solutions of various problems of radiative transfer in atmospheres of finite optical thicknesses; (b) evaluation of the free-free transitions of the negative hydrogen ion including exchange effects	500
Grant No. 14. Jeannette P. Nichols, Swarthmore, Pa. Travel abroad, stenographic and research aid, microfilms, etc., for the completion of a volume on America's monetary experience	2,000
Grant No. 15. Emil Kaufmann, New York, N. Y. Maintenance, final typing of manuscript, photographic work in connection with a study	

MICHAUX FUND

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of architectural development in England, France, and Italy during the eighteenth century	\$1,360
Grant No. 16. Hilda Geiringer, Wheaton College. Books, photostats, travel, and assistant in connection with the investigation of mathematics of heredity	600
Grant No. 17. Willem J. Luyten, University of Minnesota. Assistants in connection with the measurement of the motions of stars in the Southern Hemisphere	1,000
Grant No. 18. John C. Lapp, Oberlin College. Travel to France in connection with the critical study of the philosophical works of Pontus de Tyard together with a critical edition of the three most important of the <i>Discours philosophiques</i>	500
Grant No. 19. Henry K. Townes, Jr., U. S. Department of Agriculture. Field work in connection with the taxonomic research on the Nearctic Ichneumonidae (Hymenoptera)	400
Grant No. 20. Anne Bezanson, University of Pennsylvania. Assistance and travel in connection with the study of prices in Philadelphia during the period of the American Revolution	2,000
Grant No. 21. Robert F. Spencer, University of Oregon. Travel in connection with the investigation of the problems of acculturation of the Indians of the Klamath Reservation in southern Oregon....	750
Grant No. 22. William N. Fenton, Smithsonian Institution. Living and travel expenses, microfilm, photo copy, and supplies in connection with the preparation of a political history of the League of the Iroquois by testing the findings of ethnological field work in the historian's traditional materials	1,250
Grant No. 23. Anne Louise Hastings, Boston, Mass. Maintenance, and supplies in connection with the preparation of a manuscript of a biography of Mary Moody Emerson	900
Grant No. 24. L. V. Heilbrunn, University of Pennsylvania. Assistant in connection with the investigation to develop methods for the study of the viscosity of as many types of cells as possible....	700
Grant No. 25. James F. Crow, Dartmouth College. Assistants in connection with a study of the resistance of fruit flies to fumigants and the inheritance of resistance in crosses between resistant and susceptible strains	200

THE MICHAUX FUND

The Committee on Research has been charged with the disposition of the income from the Michaux Fund since 1941. Three grants have been awarded to Gilbert Chinard, Princeton University, for his work on Michaux from 1940 to 1943. The following grants were awarded this year from this Fund:

Grant No. 4. Phillibert Guinier, Paris, France. To study recent forestry developments in the United States	\$1,000
Grant No. 5. Gilbert Chinard, Princeton University. For the continuation of his work on Michaux	1,200

REPORTS FROM RECIPIENTS OF GRANTS¹

(ARRANGED ALPHABETICALLY UNDER THE CLASSIFICATION OF
SUBJECTS REPRESENTED IN THE MEMBERSHIP OF THE SOCIETY)

CLASS I. MATHEMATICAL AND PHYSICAL SCIENCES

MATHEMATICS

EINAR HILLE, Yale University

Grant No. 677 (1943), \$400. Studies on the theory of semi-groups.

The research project involved preparing the author's projected Colloquium Lectures for publication. After some preliminary work in 1942 and 1943, systematic work started in September 1944 after the Lectures had been delivered. A manuscript was ready in August 1946, two years to the day after the lectures had been given. Checking, revision, preparing a bibliography etc. took considerable time, however, and it was not until early in December 1946 that the manuscript could be sent to the Colloquium Committee of the American Mathematical Society. It was promptly accepted for publication and has been in the hands of the Society's Committee on Printing Contracts since the beginning of the year.

The book is entitled "Functional Analysis and Semi-Groups" and is expected to become volume XXXI of the American Mathematical Society's series of Colloquium Publications. The present manuscript amounts to xiv + 754 pages which does not include the projected index. This figure should be compared with my original estimate of 300 pages in January 1943; at the time of my previous report in September 1945 400 pages were done and the total was estimated at 700 pages. The work has been much more laborious and time consuming than I could possibly foresee in 1943. The book consists of three parts: Part one—Functional Analysis, Chapters I-V; Part two—Analytical Theory of Semi-Groups, Chapters VI-XV; Part three—Special Semi-Groups, Chapters XVI-XXI, an Appendix, Chapter XXII, a bibliography and an index.

In addition to the grant provided by the Philosophical Society, Yale University has made several grants. Professors Max Zorn and C. E. Rickart have made important contributions to the subject matter of the book in addition to numerous suggestions for improvements.

HILLE, EINAR. 1948. Functional analysis and semi-groups. Amer. Math. Soc. (in press).

¹ All grants from the Penrose Fund unless otherwise specified.

ASTRONOMY

W. A. HILTNER, Yerkes Observatory

Grant No. 905 (1946), \$750. Photoelectric observations of (1) selected Wolf-Rayet stars, (2) the polarization of the continuous radiation from early-type stars, (3) selected eclipsing variable stars and (4) selected objects in the solar system.

The first two sections of the project were given emphasis during the past observing season with the 82-inch reflector of the McDonald Observatory. The light curve of CQ Cephei, a Wolf-Rayet spectroscopic binary of shortest known period (1.64 days) was obtained in the ultraviolet (3500 Å) as well as in the visual region (5200 Å). Both light curves are of high precision (probable error of a single observation is 0.003 mag) and clearly show that both minima are asymmetrical: the star goes into eclipse more rapidly than it comes out. It is not reasonable that the asymmetry results from eccentricity of the orbit but probably is an indication of instability of the system. There is also spectroscopic evidence that the system is not stable. The secondary minimum (companion eclipsed) is appreciably broader than the primary. This phenomenon was previously observed in one other star by Kron of Lick Observatory, and can be explained on the assumption that a Wolf-Rayet star has an extended shell.

Two other Wolf-Rayet spectroscopic binaries were found to be also eclipsing binaries. One was observed extensively but only the discovery observations were made of the second one.

The well known Wolf-Rayet eclipsing binary V 444 Cygni was observed in the ultraviolet. The primary eclipse (companion eclipsed) is identical with the observations at Lick Observatory by Kron in the blue and red regions of the spectrum. This investigation was made in order to determine whether the scattering of radiation in the envelope of the Wolf-Rayet star is independent of wavelength. It now appears certain that the scattering must result from free electrons. The results of this phase of the investigation will appear in a joint paper with Chandrasekhar. This paper will also suggest an alternate hypothesis for the extremely broad emission lines in the spectra of Wolf-Rayet stars.

The second section of the project was originally started at Yerkes Observatory. A Wollaston prism and photographic plate were used in conjunction with the 40-inch refractor. This combina-

tion gave an accuracy of a single observation (0.015 mag), nearly equal to the calculated effect (0.012 mag). Evidence was obtained for the presence of polarization of radiation from the limb of an early-type star. However, a change in technic was indicated in order to make the observations definitive. Two weeks in August 1947 were devoted to this problem at which time a flicker method was employed in conjunction with the 82-inch reflector. Observations were hampered by inclement weather but the inherent accuracy of the method was confirmed. Probable polarization was observed in one eclipsing system. However, check observations were not obtained. This work is being done jointly with Dr. John S. Hall of Amherst College.

The third section of the project has not been pressed, although the light curve of one eclipsing binary has been obtained. The light curve is anomalous and shows evidence of patches, or spots, on the surface of the fainter companion. This section will receive more emphasis during the next several years.

The fourth section has not been attempted yet. Observation of several satellites of Saturn will be started in February 1948.

HILTNER, W. A. 1947. On the presence of polarization in the continuous radiation of early-type stars. *Astrophys. Jour.* 106: 231-234.

WILLEM J. LUYTEN, University of Minnesota

Grant No. 923 (1947), \$1,000. The measurement of the proper motions of 26000 stars in the southern hemisphere between declination -40 and -20 .

Grant No. 923 was received as a continuation of grant No. 831 to aid with the measurement of the motions of stars north of declination -40 ; grants of like amount were received from the Graduate School of the University of Minnesota toward the same research.

The measurements to be made involve the motions of stars north of declination -40 , and found with the Blink Microscope to possess an annual proper motion in excess of 0.03. The first section comprises the stars situated in the zone with declination limits -40 and -35 , containing some 6,300 stars. After a rather slow start with the actual measurements in January 1946—due to the difficulty of getting student assistants for the work—conditions improved greatly during the latter part of 1946 and work has continued at a satisfactory rate during 1947.

It is gratifying, therefore that it can now be reported that the motions of all stars in first zone, where the plates have centres at declination $-37\frac{1}{2}$, have been completely measured and reduced. The data thus obtained are being recorded on filing cards and will be incorporated, first into a manuscript catalogue, later into a printed catalogue which will embody all motions measured between declinations -40 and -30 .

Including the 6,300 stars mentioned above the grand total of stars measured to date has surpassed 60,000 leaving some 33,000 still to be measured. Of these, 7,100 lie in the zone centred at declination $-32\frac{1}{2}$, which zone is being attacked now, another 11,500 in the zones with centers at $-27\frac{1}{2}$ and $-22\frac{1}{2}$, and 15,000 north of declination -20 .

If the work can be continued on the same scale as at present there is every reason to hope that the $-32\frac{1}{2}$ zone may be virtually completed by the end of the next calendar year, or shortly thereafter, and the next two zones by the end of 1951. It is not now contemplated to measure the motions north of -20 .

LUYTEN, W. J. 1947. Un reconocimiento de estrellas dobles que tienen componentes enanas blancas. *Revista Union Matematica Argentina* 12: 94-98.

LUYTEN, W. J., and P. D. JOSE. 1948. Color indices of 139 proper motion stars, and 214 binary stars. *Astrophys. Jour.* 107.

FRANK BRADSHAW WOOD, Steward Observatory,
University of Arizona

Grant No. 908 (1946), \$250. Photoelectric observations of eclipsing binaries.

The 36-inch reflector and photoelectric photometer of the Steward Observatory have been used during the academic year 1946-1947 for the study of selected eclipsing binaries. Stars which have been observed include AO Cassiopeiae, TU Camelopardalis, VV Orionis, and 44i Bootis.

The observations of AO Cassiopeiae have been completed and a solution has been made. The observed minima fell about five hours later than the times predicted from the work of earlier observers. A study of all available minima suggests a change of period. New light elements are determined as

Primary Minimum = JD 243 2191.189 + $3^d.52355$ E.

A satisfactory representation of the light variation between eclipses is given by $I_e = 0.9284 - 0.0578 \cos 2\theta - 0.0118 \sin \theta +$

$0.0150 \sin 2\theta$. Here I_c is the computed light intensity and θ is the longitude of the brighter component measured in degrees from the mid-point of the eclipse of this component. The large coefficient of the cosine 2θ term indicates that the stars are highly distorted; the terms in $\sin \theta$ and $\sin 2\theta$ are indications of the asymmetry of the light curve. When the effects of these are removed from the observations in minima, the rectified depths of minima are obtained. By use of the latter and the spectrographic observations of J. A. Pearce, orbital and eclipse elements of the system have been derived.

The system consists of a pair of super-giant stars, emitting about 500,000 times the light of the sun. These are so close together that their surfaces are separated by a distance only a little greater than the radius of the smaller component. They are among the most massive known stars; their combined mass is of the order of sixty times that of the sun.

A comparison of the observations with those previously obtained by other observers, shows that the light curve varies from year to year. This variation seems to be confined to the $\sin \theta$ and $\sin 2\theta$ terms. If the unsymmetric curves are made symmetrical by application of empirical $\sin \theta$ and $\sin 2\theta$ terms, all the observations of the star can be fitted by the orbital and eclipse elements and the ellipticity coefficient derived for the present curve.

PHYSICS

FORREST F. CLEVELAND, Illinois Institute of Technology

Grant No. 582 (1941), \$693. Studies on molecular spectra and molecular structure.

Raman frequencies, relative intensities, and depolarization factors have been obtained for the following olefins: 1-octene, 2-octene (a mixture of *cis* and *trans*), *trans*-3-octene, *trans*-4-octene, 2-methyl-1-heptene, 6-methyl-1-heptene, diisobutylene, cyclohexene, dipentene, 2, 5-dimethyl-1, 5-hexadiene, and 2,5-dimethyl-2,4-hexadiene. The spectrograms were made with a Hilger E-518 spectrograph and the relative intensities and depolarization factors were obtained with the aid of a Gaertner microdensitometer. The olefins, 1-octene and 6-methyl-1-heptene, which contained the olefinic group $\text{XHC}=\text{CH}_2$, were found to have the five characteristic frequencies, 1294 (strong), 1416 (medium), 1643 (strong), 3000 (strong), and

3079 (medium) cm^{-1} . The 1643 and 3000 cm^{-1} lines were highly polarized, the 3079 cm^{-1} line was depolarized, and the first two lines were only slightly polarized. It was found that there were significant differences in the five olefinic frequencies when the olefinic group was changed. Thus for 2-methyl-1-heptene, 2,4,4-trimethyl-1-pentene, dipentene, and 2,5-dimethyl-1,5-hexadiene, all of which contained the olefinic group, $\text{XYC}=\text{CH}_2$, the olefinic frequencies were near 1299, 1404, 1649, 2979, and 3075 cm^{-1} . For *trans*-2-octene, *trans*-3-octene, and *trans*-4-octene, which contained the group $\text{XHC}=\text{CHY}$ (*trans*), the olefinic frequencies were near 1298, 1672, and 3000 cm^{-1} and the other two lines were absent. For cyclohexene, which contained the group $\text{XHC}=\text{CHX}$ (*cis*), the 1416 line was absent and the other four frequencies occurred at 1241, 1653, 3023, and 3059 cm^{-1} . For dipentene, the frequencies characteristic of the $\text{XYC}=\text{CHZ}$ group were 1246, 1682, 3012, and 3050 cm^{-1} and the 1416 line again was absent. For 2,5-dimethyl-2,4-hexadiene, which contained the group $\text{XXC}=\text{CHZ}$ and in which conjugated double-bonds were present, the 1416 line was absent and the other four frequencies occurred at 1227, 1663, 3012, and 3040 cm^{-1} .

In addition to the above investigations of olefinic hydrocarbons, three studies of acetylenic compounds have been carried out. Raman frequencies, relative intensities, and depolarization factors were obtained for 1-octyne and 4-octyne. By use of the microdensitometer with these compounds, it was shown that the previous estimated intensities were actually estimated densities, rather than intensities. In collaboration with Dr. M. J. Murray, Raman frequencies, relative intensities, and depolarization factors were obtained for the symmetrical-top acetylenes, methyliodoacetylene, methylbromoacetylene, methylchloroacetylene, and 3,3-dimethyl-1-butyne. Assignments of the frequencies to the different vibration types were made and heat capacities were calculated for the methyliodoacetylene and the methylbromoacetylene. In collaboration with Dr. Arnold G. Meister, Raman frequencies, relative intensities, and depolarization factors were obtained for dimethyldiacetylene, diethyldiacetylene, dipropyldiacetylene, dibutyldiacetylene, and diamyldiacetylene, except that for diethyldiacetylene it was not possible to obtain depolarization factors. A tentative assignment of the frequencies of dimethyldiacetylene was made and it was found that the carbon-carbon triple-bond frequency, which was known to

be at 2183 cm^{-1} for diacetylene, increased to 2264 cm^{-1} for dimethyldiacetylene, then dropped to $2251\text{--}2257\text{ cm}^{-1}$ for the other four compounds. The non-degenerate vibrational frequencies of dimethyldiacetylene have also been calculated, using the Wilson FG matrix method.

In collaboration with Dr. H. J. Taufen and Dr. M. J. Murray, Raman frequencies, relative intensities, and qualitative polarization data were obtained for four pairs of diastereomers; they were *meso*- and *dl*-2,3-butanediol, *meso*- and *dl*-2,3-diacetoxybutane, *meso*- and *dl*-2,3-dibromobutane, and *meso*- and *dl*-2,3-dichlorobutane. For each diastereomeric pair, distinct differences in spectra—far above the experimental error—were observed and multiplicities of lines in the appropriate regions for the halogenated butanes indicated the presence of rotational isomers.

An investigation of the Raman spectra of hexachloroethane and hexabromoethane was carried out with Mr. Dwight T. Hamilton. Raman frequencies, relative intensities, and depolarization factors were obtained and vibrational frequencies were calculated for hexachloroethane. The structure of the hexachloroethane molecule, for which all the fundamentals were observed, was shown to correspond to the D_{3d} symmetry.

In another investigation, a method for obtaining precise values for the depolarization factors of Raman lines was worked out and thoroughly tested with carbon tetrachloride and toluene. This method was shown to give results comparable in precision with those obtained with the method previously described by Reitz and to have the added advantage that shorter exposure times were required.

In still another investigation, in collaboration with Dr. M. J. Murray and Dr. W. S. Gallaway, the infra-red spectrum and depolarization factors of the Raman lines of spiropentane and the Raman and infra-red spectra of 1,1-dimethylcyclopropane, 1-methylcyclobutene, and methylenecyclobutane were obtained. Correlation of the observed data with the group theory selection rules indicated that the structure of spiropentane was D_{2d} and that of 1,1-dimethylcyclopropane was C_{2v} . Infra-red data were obtained both for the liquid and for the gas at various pressures, except for 1,1-dimethylcyclopropane which was investigated in the gaseous state only. Tentative assignments of the frequencies were made for each of the four hydrocarbons.

- CLEVELAND, FORREST F. 1943. Report of progress. *Yr. Bk. Amer. Philos. Soc.* for 1942: 104-105.
- 1943. Raman spectra of hydrocarbons. I. 1-octene, cis + trans-2-octene, trans-3-octene, trans-4-octene, 4-octyne, and 1-octyne. *Jour. Chem. Phys.* 11: 1-6.
- 1943. Raman spectra of hydrocarbons. II. 2-Methyl-1-heptene and 6-methyl-1-heptene. *Jour. Chem. Phys.* 11: 227-230.
- 1943. Raman spectra of hydrocarbons. III. Diisobutylene, cyclohexene, and dipentene. *Jour. Chem. Phys.* 11: 301-306.
- 1944. Raman spectra of hydrocarbons. IV. 2,5-Dimethyl-1, 5-hexadiene and 2,5-dimethyl-2,4-hexadiene. *Jour. Chem. Phys.* 12: 53-55.
- 1945. A method for obtaining depolarization factors of Raman lines, with results for carbon tetrachloride and toluene. *Jour. Chem. Phys.* 13: 101-106.
- CLEVELAND, FORREST F., M. J. MURRAY, and H. J. TAUFEN. 1943. Raman spectra of four pairs of meso and dl disubstituted butanes. *Jour. Amer. Chem. Soc.* 65: 1130-1134.
- CLEVELAND, FORREST F., and M. J. MURRAY. 1943. Raman spectra of acetylenes. VII. Symmetrical-top acetylenes. *Jour. Chem. Phys.* 11: 450-454.
- CLEVELAND, FORREST F. and DWIGHT T. HAMILTON. 1944. Raman spectra of hexachloroethane and hexabromoethane. *Jour. Chem. Phys.* 12: 249-252.
- CLEVELAND, FORREST F. and ARNOLD G. MEISTER. 1944. Raman spectra of some disubstituted diacetylenes. *Jour. Chem. Phys.* 12: 393-398.
- CLEVELAND, FORREST F., M. J. MURRAY, and W. S. GALLAWAY. 1947. Infra-red spectrum and depolarization factors of the Raman lines of spiropentane and the Raman and infra-red spectra of 1,1-dimethylcyclopropane, 1-methylcyclobutene, and methylenecyclobutane. *Jour. Chem. Phys.* 15: 742-758.

GAYLORD P. HARNWELL, University of Pennsylvania

Grant No. 260 (1938), \$1,000. Construction of a new type of beta-ray spectrograph to investigate the beta-ray spectra of electron-emitting and positron-emitting radio-elements.

The permanent magnet beta-ray spectrograph built by Plesset, Harnwell and Seidl in 1942 has been restored to use since the war. It was used in 1942 by Plesset but was idle during most of the war years when the staff was engaged upon other problems. Now it will be one of the tools in the nuclear physics project.

The first postwar problem has been the determination of the upper energy limit of the C^{14} beta-ray spectrum. Because of the low specific activities available and the long half-life of this element the permanent magnet spectrograph is particularly useful.

The result of $0.151 \pm .03$ Mev. for the upper limit of the energy was reported at the Montreal Meeting of the American Physical Society on June 19, 1947.

The present problem is a determination of the shape of the energy distribution curve of the C^{14} beta-rays.

PLESSET, E. H., G. P. HARNWELL, and F. G. P. SEIDL. 19 . A permanent magnet beta-ray spectrograph. *Rev. Sci. Inst.* 13: 351-361.

PLESSET, E. H. 1942. Nuclear excitations resulting from radioactive decay. *Phys. Rev.* 52: 181-186.

STEPHENS, W. E., and MARGARET N. LEWIS. 1947. The high energy limit of the C^{14} beta-ray spectrum. *Bull. Amer. Phys. Soc.* 22: 6.

VICTOR FRANCIS HESS, Fordham University

Grant No. 945 (1947), \$900. Experiments on the surplus gamma-radiation from granite.

Field experiments in Massachusetts and laboratory experiments with a bulk sample of granite from Quincy (Mass.) showed that the ionization produced by the gamma-rays from this type of rock is about twice as great as the one computed from their content of uranium, thorium, and potassium. In order to find out the origin of this unexpected surplus radiation, new experiments were carried out, using essentially the same technique, but shielding the ionization chambers with lead cylinders 1 cm. thick. The radium content of the bulk sample of Quincy granite was rechecked in the National Bureau of Standards and found, on the average, only 7 per cent above the figure given by Evans and Goodman.¹

These new experiments show again a surplus of penetrating radiation of about 100 per cent above the computed value, exceeding by far all possible errors in the determination of the uranium, thorium, and potassium content of Quincy granite. It is shown that neither the production of photons in transmutations induced by alpha-rays within the granite, nor spontaneous fission of uranium and thorium in this rock by cosmic rays or by neutrons from cosmic rays could account for the effect.

However, in order to test these conclusions the following experiments were performed during the summer of 1947:

(a) A large sample of crushed dunite (340 lb.), a mineral which is practically free of uranium, thorium, and potassium, was placed in an iron house (walls 10 cm. thick) surrounding a very sensitive ionization meter. It was found that the ionization observed with the dunite in the iron house was the same as with the iron house empty.

¹ Evans, Robley D., and Clark Goodman, *Bull. Geol. Soc. Amer.* 52: 459-490, 1941.

(b) The experiments were repeated with the iron house filled with about 300 lb. of crushed granite, first at Fordham University, and then in an underground station where a thick layer of rock reduced the intensity of cosmic rays to a few per cent of the value at sea level. No difference in the gamma-ray ionization from the granite sample was detected between the two levels. This shows clearly that the surplus radiation cannot be ascribed to an effect of the cosmic radiation on the granite.

Recently E. Gleditsch and T. Gráf published a new determination of the intensity of the gamma-radiation from potassium which is considerably higher than the hitherto accepted values of Mühlhoff and of Gray and Tarrant. Since this new value is in sharp disagreement with others found in the literature, further experiments will be necessary before it can be decided definitely whether the surplus radiation of granite is due to a hitherto unsuspected higher intensity of the gamma-rays from potassium or to some other source as yet unknown.

HESS, VICTOR FRANCIS. 1947. Further experiments on the surplus gamma-radiation from granite. *Phys. Rev.* 72: 609-614.

HESS, VICTOR FRANCIS, and J. DONALD ROLL, S.J. 1948. New experiments concerning the surplus gamma-radiation from rocks. *Phys. Rev.* 73.

HARALD H. NIELSEN, Ohio State University

Grant No. 381 (1939), \$500. High dispersion measurements on the infra-red spectra of polyatomic molecules.

A self recording vacuum infra-red spectrograph incorporating a graduated circle purchased with the grant made by the American Philosophical Society has been constructed and placed in operation. The spectrograph has been demonstrated to be superior to any in operation for this portion of the spectrum. Intervals as small as 0.4 cm^{-1} have been recorded in the region near 4.0μ in the infra-red.

The spectrograph has been used during the period September 1, 1946 to October 1, 1947 to study the spectra of several polyatomic molecules. The molecules studied were hydrogen sulfide, acetylene, difluoromethane, dimethylacetylene, arsine, and deuterio-arsine.

The entire spectrum of H_2S has been scanned from near 1.5μ to beyond 8.0μ and six rotation-vibration bands have been measured and resolved into rotational fine structure. The bands measured have been identified in the following manner:

ν_2	1290 cm^{-1}	ν_3	2694 cm^{-1}
ν_2	2440 cm^{-1}	$\nu_2 + \nu_3$	3790 cm^{-1}
ν_1	2611 cm^{-1}	$\nu_1 + \nu_3$	5140 cm^{-1}

where ν_2 is the deformation frequency of the molecule, ν_1 and ν_3 are respectively the symmetric and anti-symmetric valence band vibrations. This work comprises the doctoral dissertation by Dr. R. H. Noble, who is now an assistant professor at Michigan State College.

The spectrum of acetylene has been studied in much detail from 2.0μ to 15μ ; all the principal regions of absorption were remeasured and a host of new bands were found. Many new details in the spectra of linear molecules were uncovered; in particular parallel type bands (*i. e.*, bands associated with an electric moment alternating along the axis of the molecule), originating in vibration states where the angular momentum of vibration is different from zero. Such bands have been predicted by theory, but experimental data have been lacking.

The identification of the bands measured in this investigation will not be given here. The data are complete enough to give values for many of the anharmonic constants in the potential energy relation for the molecule and for the rotational constants. This work is being prepared for publication at the present time. This work constitutes the doctoral dissertation of Dr. E. E. Bell, who now is a member of the Department of Physics staff at this University.

The four fundamental bands in the arsine (AsH_3) spectrum have been investigated and several of the overtone bands and combination bands. A complete analysis of the spectrum has not yet been carried out, but it is apparent that the data will yield much knowledge concerning the potential energy constants of the molecule and concerning its size and shape. This work will constitute the doctoral dissertation by Miss Virginia McGonaghie of the Department of Chemistry of this University working in the Department of Physics.

It is proposed to continue these investigations during the year 1948 to include spectroscopic measurements on the deuterated forms of the above molecule, *i. e.*, D_2S , HDS , C_2D_2 , C_2HD , AsD_3 , AsD_2H , and AsDH_2 . In addition to these, preparations are being made to study the spectra of Phosphine (PH_3) and the deuterated forms of this molecule. The latter compound offers an interesting example for studying the Coriolis interactions between parallel

bands and perpendicular bands, i.e., vibrations where the electric moment oscillates parallel and perpendicularly to the axis of symmetry, respectively in polyatomic molecules.

BELL, E. E., R. H. NOBLE, and H. H. NIELSEN. 1947. A recording vacuum grating spectrometer for the infrared. *Rev. Sci. Inst.* 18: 48.

CHEMISTRY

ERNST BERLINER, Bryn Mawr College

Grant No. 865 (1946), \$500. Competitive bromination of alkylbenzenes for the purpose of ascertaining a possible conjugation of alkyl groups with the benzene ring.

In collaboration with Dr. Frances J. Bondhus it has been shown that t-butylbenzene is brominated about 115 times faster than benzene. Since it had previously been shown that toluene is about 4 times faster than t-butylbenzene in a bromination reaction,¹ it follows that toluene is about 450 times more reactive than benzene in this type of a substitution reaction. Whereas the difference between toluene and t-butylbenzene was explained on the basis of hyperconjugation, involving hydrogen atoms only, the much greater difference between t-butylbenzene and benzene cannot be accounted for by this theory, since no hydrogen atoms are available for conjugation with the benzene ring. It is postulated that in t-butylbenzene resonance with the side chain is possible if the concept of hyperconjugation is extended to include methyl groups. This idea is supported by quantum mechanical calculations of Mulliken.

Physical constants of alkylbenzenes and reaction rates involving alkylbenzenes have been collected, and it is demonstrated how a number of physical constants, such as resonance energies (from heats of combustion), dipole moments, or molecular refractivities follow the order of hyperconjugation involving the carbon-carbon bond (t-butyl greater than methyl), whereas in reactions or equilibria the order of reactivity follows the number of hydrogen atoms available for conjugation (methyl greater than t-butyl). Different factors are enumerated which might be of importance in the formation of the activated complex and might revert the ground-state order of the non-reacting molecule to the order observed in reactions. The factors include bond polarizabilities, electronegativities,

¹ Berliner, Ernst, and Frances J. Bondhus. No-bond resonance. The competitive bromination of toluene and t-butylbenzene, *Jour. Amer. Chem. Soc.* 68: 2355-2358, 1946.

and solvent composition. On the other hand, on the basis of bond energies, carbon-carbon hyperconjugation would seem to be a preferred type of resonance, and it is suggested that free radical reactions should follow the carbon-carbon order of hyperconjugation. This is born out by the known data on the dissociation of alkylhexaphenylethanes into free radicals.

BERLINER, ERNST, and FRANCES J. BONDHUS. 1948. Hyperconjugation II. The competitive bromination of benzene and t-butylbenzene. *Jour. Amer. Chem. Soc.* 70: 854.

J. LOGAN IRVIN AND ELINOR MOORE IRVIN,

The Johns Hopkins University, School of Medicine

Grant No. 937 (1947), \$1,750. Apparent acid dissociation exponents of various antimalarial compounds.

In recent publications¹ data have been presented for the apparent acid dissociation exponents of a series of derivatives of 4-aminoquinoline. It has been demonstrated that the strength of the reaction of a proton with the ring-nitrogen atom of the 4-aminoquinolines is much greater than the corresponding proton-exchanges for quinine and pamaquine (plasmochin). This strengthening has been ascribed to the powerful resonance of the monopolar cation of the 4-aminoquinolines.

A second, reversible proton-exchange involving the aromatic nucleus of the 4-aminoquinolines (4-amino group as *acceptor*) occurs in concentrated aqueous solutions of sulfuric acid. The addition of this second proton is a considerably weaker reaction than the corresponding exchange involving the 8-amino group of pamaquine, and this weakening also can be ascribed to the important special resonance of the monopolar cation of the 4-aminoquinolines. These proton-exchanges involving the secondary amino groups of SN-3294 and pamaquine² have been studied by spectrophotometry, and the data have been formulated in terms of the extended pH scale of Michaelis with rectification by the logistic

¹ Irvin, J. Logan and Elinor Moore Irvin, Acid-base reactions of quinoline and acridine derivatives. *Fed. Proc. Exp. Biol.* 5: 139, 1946; Irvin, J. Logan and Elinor Moore Irvin, Spectrophotometric and potentiometric evaluation of apparent acid dissociation exponents of various 4-aminoquinolines. *Jour. Amer. Chem. Soc.* 69: 1091-1099, 1947.

² Pamaquine is 8-(4-diethylamino-1-methylbutylamino)-6-methoxyquinoline. SN-3294 is 4-(4-diethylamino-1-methylbutylamino)-6-methoxyquinoline.

analysis of Reed and Berkson. The data conform well to the equation,

$$\text{pH}(\text{H}_2\text{SO}_4) = \text{pK} + \log \frac{\alpha}{1 - \alpha}$$

in which $\text{pH}(\text{H}_2\text{SO}_4)$ refers to the extended pH scale of Michaelis, pK is the acid dissociation exponent, and α is the degree of dissociation of the proton-donor (acid), BH_2^{++} , into BH^+ and H^+ , with B representing the aromatic portion of the molecule. These dissociation exponents of pamaquine and SN-3294 were found to have the values -1.33 and -7.83 , respectively. Values of this exponent for other 4-aminoquinolines range from -5.93 for 3-methyl-4-(4-diethylamino-1-methylbutylamino)-7-chloroquinoline to -8.89 for 4-(4-diethylamino-1-methylbutylamino)-7-chloroquinoline.

In aqueous solutions of sulfuric acid from 7M to 18M, quinine and pamaquine undergo reversible changes in spectrophotometric absorption and fluorescence which may be due to proton-exchanges involving the methoxy groups of these compounds. The brilliant fluorescence of pamaquine in 18M sulfuric acid provides the basis of a method for the determination of pamaquine in plasma and urine.

From pH 4 to pH 10 in aqueous solutions, 4-hydroxyquinoline exhibits spectrophotometric absorption which is remarkably similar to that of the monopolar cation of 4-aminoquinoline. Spectrophotometric evidence has been obtained for two reversible proton-exchanges involving 4-hydroxyquinoline. These exchanges occur from pH 4 to pH 1 and from pH 10 to pH 13, respectively. These data suggest that 4-hydroxyquinoline in the range extending from pH 4 to pH 10 is a highly resonating molecule the resonance-hybrid of which receives contributions from Kekulé and quinonoid structures, the latter being equivalent to 4-quinoline.

JAMES F. MEAD, Occidental College

Grant No. 840 (1945), \$750. Action of lead tetracetate on amino-alcohols and amino-glycols, with reference particularly to the products formed.

Determination of Completeness of Oxidation.—The substrate, about 10^{-4} moles, in water solution or emulsion was treated with a 10 per cent excess over the theoretical amount of a saturated solution of potassium metaperiodate (1.66×10^{-2} moles per liter) for twenty minutes. To the resulting solution was added borax-boric

acid buffer solution, and potassium iodide, and the liberated iodine was titrated with standard arsenite solution.

Determination of Formaldehyde.—In the absence of ammonia, the oxidation mixture, after standing for twenty minutes, was treated with a 10 per cent excess over the theoretical amount of dimethyldihydroresorcinol¹ in alcohol solution, brought to pH 4, warmed to 60°, and allowed to stand in the ice-box until precipitation was complete. The formaldehyde dimethone was collected and weighed, and the melting point taken to determine the purity of the sample.

In case ammonia was formed in the reaction, the following procedure was adopted. The substrate and periodate solutions were mixed, and dimethyldihydroresorcinol in hot water solution was added immediately. After twenty minutes, the solution was brought to pH 4 and treated as before.

Determination of Acid.—If no ammonia was formed in the reaction, the oxidation mixture, after twenty minutes, was titrated with standard alkali. If ammonia was formed, the solution was acidified with sulfuric acid and about three-fourths of it distilled. Water was added, and the distillation repeated. The distillate was then titrated with standard alkali.

Determination of Ammonia.—If no acid was formed in the reaction, the oxidation mixture, after twenty minutes, was titrated with standard acid.

Determination of Amides.—If the formation of amide was indicated (see above), the solution, after completion of the oxidation, was made strongly acidic with sulfuric acid, refluxed for two hours and then distilled to about one-fourth volume, and the distillate titrated with standard alkali. If the acid formed was known, it was necessary to distill and titrate only 10 per cent of the solution, and calculate the total amount originally present.²

¹ Horning, E. C., and M. G. Horning, Methone derivatives of the aldehydes, *Jour. Org. Chem.* 11: 95, 1946.

² Gillespie, L. J., and E. H. Walters, The possibilities and limitations of the Duclaux method for the estimation of volatile acids, *Jour. Amer. Chem. Soc.* 39: 2027, 1917.

CLASS II. GEOLOGICAL AND BIOLOGICAL SCIENCES

PALEONTOLOGY

CHESTER STOCK, California Institute of Technology

Grant No. 580 (1941), \$1,000. Occurrence of dinosaurs in the Upper Cretaceous of California.

Although considerable progress had been made in the conduct of field and laboratory studies relating to the occurrence of dinosaur remains in the Upper Cretaceous of California after the grant was received from the American Philosophical Society, the investigations were of necessity set aside during the war. Because of readjustments which came into existence with the post-war period it has not been possible until very recently to pursue again these paleontological studies.

Field operations have brought to light fossil evidence of hadrosaurian (trachodont) dinosaurs in Cretaceous deposits exposed in the Panoche and Tumey Hills on the eastern flank of the middle Coast Ranges. The localities are in western Fresno and eastern San Benito Counties, California. The best preserved material, on which a generic identification can be established is that from the Tumey Hills. This specimen comprises a single individual. It has now been prepared in the laboratory and is being illustrated. Studies are still in progress to determine the stratigraphic relations of the deposits from which the material has come to the Moreno Formation containing remains of dinosaur, plesiosaurs, and mosasaurs in the Panoche Hills to the north. The stratigraphic evidence would seem to indicate a position rather high in the Cretaceous section.

Since the remains of duck-billed dinosaurs are of relatively frequent occurrence in the Cretaceous of the mid-continental region of North America, it would appear to be of particular significance from the standpoint of geological correlation to determine the generic and specific relationships of the dinosaurs from the Pacific Coast to those known from the former area.

ZOOLOGY

JEAN L. A. BRACHET, University of Pennsylvania

Grant No. 898 (1947), \$1,500. Studies in chemical embryology.

A number of experiments on the mechanism of the inducing activity of the organizer have been performed. One of the problems

attempted was to try to find out whether there is an actual transfer of substances from the organizer to the reaction cells. It has been found that when an organizer which has been vitally stained with neutral red is grafted into a gastrula, the cells which come into contact with it become stained. The dye is firmly bound to formed inclusions, such as yolk platelets, pigment granules, and ultramicroscopic particles rich in ribonucleic acid. Numerous explantation experiments have also been made, in which a cellophane sheet was inserted between an organizer and a piece of epidermis, but the histological study of these explants has yet to be done.

In view of the apparent importance of nucleic acids and of nucleotides in the evocation of the neural plate, explants of *Ambystoma* and of *Rana* have been cultivated in yeast nucleic acid, yeast and muscle adenylic acids, guanylic acid, adenosinetriphosphoric acid and in cozymase, all in low concentrations (0.5 mg/cc or less). It has been found that these substances are toxic for *Ambystoma* explants, in which they produce cytolysis, but not for *Rana* epidermis. The complete interpretation of these experiments will not be able to be made until the explants have been sectioned and studied.

In collaboration with Dr. E. J. Krugelis the localization of alkaline phosphatase in developing *Rana* and *Ambystoma* eggs has been studied. It was found that the enzyme is present only in the nucleus (nuclear sap and nucleoli) of the young oocytes. During cleavage stages alkaline phosphatase is present only in small amounts and is evenly distributed in the nuclei and in the cytoplasm. In gastrulation, however, there is a marked synthesis of this enzyme both in the nuclei and in the cytoplasm, and the phosphatase is now distributed along definite gradients, identical with those previously described for ribonucleic acid in the same stages.

In Axolotl eggs quantitative estimations of ribo- and desoxyribonucleic acids have been made, and the results show that ribonucleic acid is apparently converted into desoxyribonucleic acid during the period of segmentation. From gastrulation onward, both types of nucleic acids are synthesized simultaneously.

Considerable material was collected during the summer at the Marine Biological Laboratory at Woods Hole, Massachusetts, for the purpose of studying the ribonucleic acid content of and localization in normal and centrifuged eggs and embryos of

various species in their development (*Arbacia*, *Asterias*, *Mactra*, *Chaetopterus*, *Echinarachnius*, *Cynthia*, *Amoeridium*). Sea-urchin eggs at different stages of development (unfertilized eggs, blastulae, plutei) have been preserved as well for the purpose of analyzing their ribo- and desoxyribonucleic acid metabolism.

In collaboration with Mr. J. R. Shaver it has been found that crystalline ribonuclease, although it completely removes the basophilia from sections of all tissues tried, does not appreciably decrease the intensity of cytochemical reactions for tyrosine and arginine, when these tests are applied to similarly treated sections. It would appear that ribonuclease has little proteolytic activity, when used under the experimental conditions required for the cytochemical detection of ribonucleic acid.

OTTO C. GLASER, Amherst College

Grant No. 604 (1941), \$691.98. Quantitative spectrographic analysis of salt metabolism in developing *Fundulus* eggs and senescent *Drosophila*.

During the analysis of mineral metabolism in developing *Fundulus* eggs (1943) it became desirable to study also Cu metabolism during the development of the ascidian, *Styela partita*. Grave (1944)¹ found that when the concentration of CuCl_2 in sea-water is increased by $5 \times 10^{-6}\text{M}$, the time required for metamorphosis is reduced from a maximum of 100 hours to a minimum of approximately $\frac{1}{2}$ to $2\frac{1}{2}$ hours. Higher concentrations ($5 \times 10^{-4}\text{M}$) proved lethal within 30 minutes. These results indicate an absorption of Cu. Normal metamorphosis was interpreted as the outcome of poisoning a larval enzymic system whose breakdown was considered essential for the disruptive phases characteristic of the transformation of the larva to a young adult.

As the result of experiments on crowding and also by exposing new sets of larvae to sea-water in which others had previously metamorphosed, Grave (*loc. cit.*) likewise found that the larvae themselves eliminate some material that accelerates development. Ultimately this material may also reach lethal concentrations.

Since these experiments parallel those with CuCl_2 , we attempted to discover whether the accelerative material set free by the larvae contains Cu. To date our results indicate that the first 200 larvae

¹ Grave, Caswell, The larva of *Styela* (*Cynthia*) *partita*; structure, activities and duration of life. *Jour. Morph.* 75: 173-188, 1944.

added to a given volume of sea-water containing approximately $10^{-5}M$ Cu salts, measured spectroscopically, unmistakably decrease its Cu content. When these larvae are removed and followed by a second set of 335, the Cu content undergoes a further but proportionately much slighter relative reduction. If now a third lot of 930 is added to this doubly conditioned sea-water, the Cu content rises. We therefore assume a two-way traffic in Cu with absorption sufficiently in excess of elimination so that the latter does not become apparent, even by spectroscopic methods, until roughly 150 larvae/cc have undergone metamorphosis.

Provisionally then we attribute the accelerative effects of adequately conditioned sea-water to the elimination of Cu from the larvae. By the same token, the destructive effect of sea-water conditioned by 2000 larvae/cc (Grave, *loc. cit.*) may be attributed to a lethal concentration of either Cu or Cu-carriers derived from the metamorphosing larvae themselves.

This investigation was carried on in collaboration with Professor Gladys A. Anslow of Smith College.

GLASER, O. C. 1944. Report of progress. *Yr. Bk. Amer. Philos. Soc.* for 1943: 146.

EDMUND K. HALL, University of Louisville School of Medicine
Grant No. 933 (1947), \$100. Studies on spinal cord hypoplasia after limb amputation in the fetal rat.

A large number of investigations on both amphibian and chick embryos have combined to demonstrate that the development of the nervous system in these forms occurs under the influence of the peripheral field. This is shown by the fact that it is possible to obtain hypoplastic effects in both the dorsal (sensory) and the ventral (motor) portions of the spinal cord after the peripheral field is reduced (as by the amputation of the limb bud at early stages), whereas, on the other hand, hyperplastic effects may be obtained in the same regions of the spinal cord after the peripheral field is increased (as by the implantation of an additional limb bud). The effects in the dorsal (sensory) portion of the spinal cord are secondary to similar hypo- or hyperplastic effects in the spinal ganglia associated with that region of the spinal cord, since these are the primary neurones on the sensory pathway.

A previous investigation by the author (*Jour. Comp. Neur.* 82) has shown that when similar experimental procedures are applied

to a mammalian form (the white rat), comparable results may be obtained in the spinal ganglia. The fore limbs of rat fetuses may be amputated in utero during the last third of pregnancy (duration 21 plus days), with survival of both mother and fetus until the end of pregnancy, and normal delivery of the fetus. The spinal ganglia of the nerves supplying the fore limb show various degrees of hypoplasia, depending on the level of the ganglion and the specimen, the most extreme effect being found in an animal operated upon a little more than four days before birth, in which the hypoplastic effect in the eighth cervical ganglion amounts to 75 per cent.

In the present investigation, the effects of amputation of the fore limb on the development of the spinal cord are being examined. These effects are comparable to those obtained by other authors who have performed similar operations on amphibian and chick embryos, and they are to be observed both in the dorsal (sensory) and in the ventral (motor) portions of the spinal cord.

In the dorsal gray matter of the spinal cord the effects are diffuse. The numerous, small, multipolar cells of which this gray matter is composed are present in the same concentration on both operated and unoperated sides, but there is a volume hypoplasia on the side of the operation which varies from about 7 per cent to 27 per cent in the various cases, the effect being greatest at the eighth cervical and first thoracic segments of the spinal cord, and declining gradually both rostrally and caudally. This volume hypoplasia evidently indicates a corresponding deficiency in cell number on the operated side, which must be attributed to a decrease in the rate of cell division on that side.

In the ventral gray matter of the spinal cord, the effects are not diffuse, but are localized in the longitudinal columns of large multipolar neurones which supply the muscles of the fore limb. These columns may be designated in the rat, as in other forms, as the ventro-lateral, which supplies the proximal muscles of the extremity, the dorso-lateral, which supplies more distal muscles, and the retro-dorso-lateral, which supplies the most distal muscles. As might be expected, the deficiency in motor cell number is least in the ventro-lateral cells of the operated side, it is greater in the dorso-lateral cells, and it is most pronounced in the retro-dorso-lateral column of cells. As in the dorsal gray hypoplasia, the effect is most concentrated in the eighth cervical segment of the spinal

cord, where the deficiency in the number of motor cells in the retro-dorso-lateral cell column amounts to 29, 68, and 81 per cent in the three cases most carefully studied (11,303 cells counted). It is difficult to say whether these deficiencies in motor cell number are to be accounted for by the failure of indifferent cells to differentiate, or by a retardation in the rate of cell division in this region. Cell divisions continue to be found in the rat spinal cord for two weeks after birth; on the other hand, it is also true that a large number of small, undifferentiated neurones are to be seen where the hypoplastic effects are greatest.

It is certain, however, that the hypoplastic effects observed, both in the ventral and in the dorsal gray matter may not be attributed to ascending or retrograde degeneration. This it is possible to affirm on the basis of cases now being obtained and studied in which the fetus is operated upon in the usual way, but instead of being allowed to develop until birth, the operated animals are being fixed at twenty-four-hour intervals after operation. Such cases show intermediate effects in the development of the hypoplastic effects, which are plainly visible only forty-eight hours after operation. There is no indication, however, of the characteristic cytological details found in ascending degeneration, either in the ventral or in the dorsal gray matter of the spinal cord, or in the spinal ganglia which show the hypoplastic effect.

The hypoplastic effects which have been observed must therefore be attributed to modes of reaction hitherto undescribed in the mammalian nervous system. These reactions are related to those found after similar operations on amphibian and avian forms. As in these lower forms, the reduction of the peripheral field in the mammal during early developmental stages results in an underdevelopment of the region of the spinal cord associated with that field. This is evidently accomplished, in the dorsal gray matter, by a retardation in the rate of cell division; in the ventral gray matter, on the other hand, the hypoplastic effects may perhaps be brought about in the same way, but it is also quite possible that they are due to the failure of undifferentiated motor neurones to grow and differentiate.

JOHANNES F. K. HOLTGRETER, University of Rochester
Grant No. 850 (1945), \$200. Studies on developmental embryology.

Investigations of two sets of interrelated topics have been made:
(1) Observations and experiments on isolated embryonic amphibian

cells with special reference to cellular structure, motility, aggregation, and differentiation; (2) experimental studies on embryonic cell inclusions, particularly of yolk, lipochondria, and microsomes.

(1) It has been shown that the structural organization of early amphibian cells resembles that of an amoeba in that it consists of four concentrically arranged layers, namely, an inner core of plasmasol, a capsular wall of plasmagel, a liquid layer of ectoplasm, and an outer cell membrane. Most embryonic cells possess a non-axial polarity, the relatively more mobile anterior pole corresponding to that side of the cell which is originally facing the interior of the early embryo. Cellular motion results from a coordinated interplay of periodical extensions and contractions of the advancing portion of the cell body and of annular contractions travelling over the cell surface in a backward direction. The evidence at hand points to the conclusion that these amoeboid movements are initiated and executed by forces localized in the cell membrane. The same forces seem to be involved in the process of cytoplasmic division. Based upon the data on the composition and fine structure of the cell membrane as well as on experiments with artificial membranes having a comparable structure, the suggestion is made that amoeboid motility may be due to alternate states of the degree of packing of radially arranged lipid molecules present in the cell membrane, involving reversible changes of hydration.

The structural and kinetic phenomena associated with the differentiation of isolated embryonic cells into specific cell types have been studied, using as examples neuroblasts, myoblasts, erythroblasts, mesenchyme, and epidermis cells. Other studies have been devoted to the problems of cytotoxicity, selective cellular adhesiveness, phagocytosis, and the effect of electrolytes and pH on shape and motility of the embryonic cell.

(2) In continuation of previous work on the distribution, composition, and physiological significance of formed inclusions of the amphibian egg, observations have been made on the basophilic particles (known from the investigations of J. Brachet) and on the subcortical vacuoles which appear in the epidermis at the period of yolk resorption. The granules which react selectively to Feulgen's plasmasol stain, seem to play an important role in various metabolic processes, including embryonic induction. As to the vacuoles, staining and other reactions indicate that they are of a lipoprotein nature. Vacuoles having similar properties can be pro-

duced artificially by combining the dissociated components of yolk and lipochondria, suggesting that the latter may serve as a material for the elaboration of membranous structures of the normal cell.

- HOLTGRETER, JOHANNES F. K. 1946. Experiments on the formed inclusions of the amphibian egg. II. Formative effects of hydration and dehydration on lipid bodies. *Jour. Exp. Zool.* 102: 51-108.
- 1946. Experiments on the formed inclusions of the amphibian egg. III. Observations on microsomes, vacuoles, and on the process of yolk resorption. *Jour. Exp. Zool.* 103: 81-112.
- 1946. Structure, motility and locomotion in isolated embryonic amphibian cells. *Jour. Morph.* 79: 27-62.
- 1947. Morphogenesis, crenation, and cytolytic reactions of the erythrocytes of amphibians. *Jour. Morph.* 80: 345-368.
- 1947. Changes of structure and the kinetics of differentiating embryonic cells. *Jour. Morph.* 80: 57-92.
- 1947. Observations on the migration, aggregation and phagocytosis of embryonic cells. *Jour. Morph.* 80: 25-56.
- 1948. Significance of the cell membrane in embryonic processes. *Proc. New York Acad.* (in press).

GEORGE G. LOWER, Upper Darby High School

Grant No. 975 (1947), \$904.80. To film in color the work and marine life at the Biological Station of Bermuda, and the Marine Biological Laboratory, Woods Hole.

The funds provided by this grant enabled the continuance of my work started in the fall of 1946. The Bermuda Biological Station for Research gave me a grant of \$350 to be used in the spring of 1947. The grant by the Society was used to carry on my work from May 28 to September 1 at the Biological Station of Bermuda and the Marine Biological Laboratory, Woods Hole, Massachusetts.

The work divides itself into six parts: (1) Color movies, 16 mm of Marine Life, Activities of the Bermuda Biological Station and of Bermuda in general. (2) Color stills, 35 mm (2 x 2 inch lantern slides) of Marine Life, Plant Life, Station Activities and Bermuda in general. (3) Assisting Dr. C. E. Kenneth Mees, Vice President, Eastman Kodak Co. in charge of research with special work in color photography. (4) Assisting Dr. E. Newton Harvey, Princeton with his Deep Sea Photography. (5) Color stills, 35 mm (2 x 2 inch lantern slides) of Bermuda Sponges under the direction of Dr. Max W. deLaubenfels, University of Hawaii, specialist in Marine Porifera. (6) Organization of work, lecture and exhibition at the Marine Biological Laboratory, Woods Hole, Massachusetts.

The color movies are organized into two parts: first, "Coral Gardens of Bermuda," 1200 feet (1 hour) color, silent, 16 mm with introductory title of the following, untitled topics: (1) Arriving by seaplane. Shot from window and from seaplane base. (2) Shore habitats. Cave and tide pools at Cock Rocks. (3) The "Boiler" reefs from the surface. (4) Collecting by Dredge and by Helmet Diving. (5) Reefs and reef life from special set-ups in the Government Aquarium and at the Biological Station. (6) Sargasso fish. (7) Sponges, in habitat made at the Station. (8) Anemone eating fish. (9) *Cyanea artica*, swimming and stinging fish. (10) Giant Green Moray eating fish. (11) Fight between small Octopus and Rock Crab. (12) The Easter Lily Fields of Bermuda. (13) Flower gardens at the Government Aquarium and at Hamilton. (14) Leaving Hamilton by boat. (15) Arriving by boat at New York.

The second color film is being compiled on the "Activities of the Bermuda Biological Station for Research" and will be about 400 feet (20 minutes). It is still in the process of editing and duplicating and will probably be available in the Spring of 1948.

The color stills were made during about seven months and consist of about 240 on Marine Life and about 160 on the Biological Station, Bermuda Plant Life and Bermuda in general.

The work with Dr. Mees involved the making of color prints at the Station mainly with equipment and supplies provided by him. To do this a new Eastman color negative was used. Dr. Mees is using these color negatives and some that I made for him during the summer, in evolving the mechanization of their printing in color at the Eastman Kodak Co.

The Deep Sea Photography project of Dr. E. Newton Harvey used a robot camera in a diving bell involving time lapse photography using the new repeating flash tubes. This apparatus which he designed had its initial try-out at the Station. I took color stills of the apparatus and its use.

The sponge work involved the color photography in stills of the sponges of Bermuda.

Three exhibition cases have been built to exhibit about three hundred 2 by 2 inch lantern slides each. One of these cases is at the Biological Station in Bermuda, two are at the Laboratory in Woods Hole and a fourth one is in construction and will be on exhibition at the Society's headquarters.

A debt of gratitude goes to Dr. Dugald E. S. Brown, Director of the Bermuda Station and to Mr. Louis S. Mowbray, Director of the Bermuda Government Aquarium. Without the help and inspiration of these two men, and the use of their staffs and equipment, the pictures would have been impossible.

The films and slides may be obtained from me at Westtown, Pennsylvania, as they become available.

PAUL AMOS MOODY, University of Vermont

Grant No. 563 (1941), \$150. Serological investigation of speciation and evolution, employing the Libby photonreflectometer.

The photonreflectometer is a photoelectric instrument for measuring turbidity. Applied to the precipitin reaction, it makes possible measurement of turbidities developed in a series of tubes containing antigen and antibody mixed in varying proportions. As the test is ordinarily performed, the tubes contain a constant quantity of antiserum and varying concentrations of antigen. Thus there can be plotted the entire course of the precipitin reaction, ranging from a mixture containing an excess of antigen, through optimal proportions of antigen and antiserum, to a mixture containing insufficient concentration of antigen to promote development of turbidity.

The initial investigation demonstrated the possibility of employing the instrument to distinguish serologically between species in genus *Peromyscus* (Moody, 1942). The work referred to in the initial report on this grant was extended by Itzkowitz (1943) to include additional species within the genus and to test the minimum amount of difference which could be detected. It was found that sera from *P. gossypinus* and *P. leucopus*, species which readily hybridize, could be distinguished by the precipitin reaction when the photonreflectometer was employed. In general, serological similarities between the tested species were found to conform to expectation based upon the accepted classification. The study also included investigation of the effect of opalescence of antigen upon photonreflectometer readings; an abstract on this phase of the work was published by Moody and Itzkowitz (1943).

The investigation was interrupted during the war but was resumed in 1946. The relationship of the lagomorphs (hares and rabbits) to the rodents has long been a matter of disagreement.

Serological evidence on this question has not been presented, partly, no doubt, because a source of antibodies other than the familiar laboratory rabbit must be employed. We have found that male domestic fowl readily form antisera against rabbit sera and against rodent sera. By the use of such antisera, rabbit serum is sharply distinguished from sera of rodents, as well as from sera obtained from representatives of other orders of mammals.

The precipitin test, read with the photronreflectometer, also distinguishes readily between the sera of different species of lagomorphs (Drugg, 1947). A preliminary report of this work will be presented before the second annual meeting of the Society for the Study of Evolution (Chicago, December, 1947). Preliminary results indicate that the lagomorphs are at least no more akin to rodents, serologically, than they are to a number of other orders of mammals. At the present time the investigation is being expanded to include as many orders of mammals as possible in the hope of gaining insight into the true affinities of lagomorphs, a subject on which the morphological and paleontological evidence has not proven decisive.

DRUGG, HELEN. 1947. Some relationships among mammalia as determined by interfacial and turbidity tests employing chickens as precipitin producers. Master's Thesis, Univ. of Vermont Library.

ITZKOWITZ, CHARLES. 1943. Some relationships among rodents in the genus *Peromyscus* as determined by the precipitin technique employing the photronreflectometer. Master's Thesis, Univ. of Vermont Library.

MOODY, PAUL A. 1943. Report of progress. *Yr. Bk. Amer. Philos. Soc.* for 1942: 138-139.

MOODY, PAUL A., and CHARLES ITZKOWITZ. 1943. Opalescence of antigen as a variable in serological investigations with the photronreflectometer. *Anat. Rec.* 87(4): 29-30.

JANE M. OPPENHEIMER, Bryn Mawr College

Grant No. 906 (1947), \$3,000. Experimental studies on the development of structure and function in the central nervous system of *Fundulus* embryos.

The development of function has been studied in *Fundulus heteroclitus* embryos in which the central nervous system has been rendered abnormal by operations performed during gastrula stages.¹ Implantations have been made which have resulted in

¹Part of investigation carried out at Osborn Zoological Laboratory, Yale University, during tenure of a John Simon Guggenheim Memorial Foundation Fellowship.

the development of supernumerary brain parts in structural and presumably functional continuity with the brain of the host, and which in some cases have resulted also in the suppression, duplication, or other rearrangement of parts within the host brain.

The operated embryos were allowed when possible to develop until free-swimming stages were reached. Gross qualitative observations were made on the development of the behaviour-pattern in over 50 such embryos, attention being devoted particularly to the postural, equilibratory, and locomotor reactions, and to the coordination of eye, mouth, and branchial movements. The behaviour of the operated embryos was in some cases virtually normal, while in others it deviated more or less from the typical pattern.

The embryos were prepared for histological study by the Bodian technique. While defects in behaviour could sometimes be correlated with the disturbance of normal anatomical relationships within the brain, in many cases structural rearrangements within the brain did not result in altered function. In the majority of cases, although sometimes the reverse is true, there was less disturbance of function than of structure. It may be concluded that considerable regulation of function is possible in *Fundulus* embryos when disturbances are set up at sufficiently early stages of development, and that whether parts are added to it, duplicated, or suppressed, the nervous system as a whole in this form tends to regulate to form an orderly working whole.

The development of behaviour has also been studied in *Fundulus heteroclitus* embryos subjected to treatment with solutions of metrazol.² Over 500 embryos, subjected to treatment at various stages, have been raised in metrazol solutions of either 0.1 per cent or 2 per cent for varying periods of time, in some cases dechorionated, in others with chorion intact.

The effects, which were more drastic in the dechorionated embryos, varied in embryos of different age-groups and differed with the strength of solution used and the duration of immersion. In some cases recovery occurred when the embryos were transferred to tap- or sea-water.

No embryos treated with 2 per cent solution before gastrulation developed normally; some embryos treated with 0.1 per cent solution at pregastrular stages attained the hatching stage. Embryos

² Part of investigation carried out at Marine Biological Laboratory, Woods Hole.

treated after gastrulation but before the beginning of circulation developed as long as 14 days in the weaker solution; in the stronger, only 2, both with intact chorion and transferred from metrazol after $2\frac{1}{2}$ days, reached stage 31.³

In embryos treated between stages 23 and 32, the rate of the heartbeat became slowed and a large vesicle filled with static blood developed in the venous system just distal to the sinus venosus. Many embryos treated between stages 23 and 26 developed sharp localized contractures of the trunk musculature. Many embryos treated between stages 23 and 32, whether or not such localized contractures were present, exhibited varying degrees of kyphosis or lordosis, involving sometimes tail, sometimes trunk, sometimes both. Embryos treated between stages 27 and 32 sometimes also showed abnormalities in the mouth and branchial movements. Embryos treated after stage 32 did not become kyphotic or lordotic, but often exhibited very sharp lateral contractions; these embryos lost their righting reflexes during the period of treatment, and held their mouths stretched wide open without rhythmic movement.

Whether the drug acts through the nervous system, or directly on the muscular system, to produce these effects, cannot be ascertained until the histological examination of the embryos is completed. Preliminary histological study suggests a selective action of the drug on the cell-layers of the central nervous system nearest the central canal.

OPPENHEIMER, JANE M. 1947. Functional regulation in *Fundulus heteroclitus* embryos with operated brains. Abstract. *Anat. Rec.* 99: 9-10.

—1947. The development of *Fundulus heteroclitus* embryos in solutions of metrazol. *Proc. Soc. Exp. Biol. & Med.* 66: 49-50.

RUTH PATRICK, Academy of Natural Sciences of Philadelphia

Grant No. 79—Johnson Fund (1947), \$1,000. To study the chemical and physical properties of the water in which diatoms live in order to know the factors involved in their distribution.

This expedition to the central plateau of Mexico, which was undertaken by Dr. Ruth Patrick, of the Academy of Natural Sciences, and Dr. Charles Hodge 4th, of Temple University, was for the purpose of collecting diatoms and grasshoppers.

The primary object of the grasshopper collecting was to inject and preserve material for study of the internal anatomy. Pre-

³For an explanation of the stage numbers, see Oppenheimer, Jane M., The normal stages of *Fundulus heteroclitus*, *Anat. Rec.* 68: 1-15, 1937.

served and injected insects for internal anatomy are not readily available by correspondence with other collectors. Anatomical work has been done on too few species outside the bounds of continental United States. No comprehensive comparative anatomical study has yet been made on the different subfamilies and tribes of the family Acrididæ or grasshoppers.

During the summer of 1947 fifty species of grasshoppers, distributed through most of the important subfamilies of the Acrididæ, were collected from the central plateau of Mexico between Mexico City and Guadalajara and San Luis Potosí. The material was preserved in 70 per cent alcohol after having the body cavity injected with the same preservative. This material will be dissected and the results published in form similar to the previous publications of Hodge on the internal anatomy of representatives of the three common North American subfamilies.

In addition, 3375 specimens of insects consisting of 1968 Orthoptera and 1023 Coleoptera were turned over to the Academy of Natural Sciences for their collections.

As to the reason for the diatom collecting, to date only very fragmentary information concerning the diatom flora of this region is known. As this region is part of the area covered by *The North American Flora* for which Patrick is writing the diatom volume, it was very necessary that such collections be made. This area was carefully studied and collections were made from as many different habitats as possible.

In order to understand better the ecological factors affecting diatom distribution, chemical analyses of the water were made. This was accomplished by a special field chemical set which was designed by W. H. and L. D. Betz and Company. The following chemical determinations were made: pH, hardness, calcium, chloride, sulphate, silicon, iron, dissolved oxygen, and dissolved carbon dioxide. Temperature and turbidity of the water were also determined. Fifty different samples of water were analyzed. It was the general opinion of the scientific people we talked to that these were the most extensive analyses of natural surface waters which had been made in Mexico.

From the chemical analyses of the waters it was evident that no acid waters were sampled. This is to be expected as the surface rock of this region is largely of volcanic origin. The waters varied in mineral content from very low, as found in the lakes in the

crater of Nevada de Toluca, to very high, as found in some rivers and Lake Pátzcuaro. A preliminary study of the diatoms has shown some interesting facts concerning diatom distribution. Several new species have been encountered. The first report of these studies was given before the American Limnological Society at their Chicago meeting in December 1947.

One of the major factors which has affected the ecology of Lakes Chapala and Pátzcuaro is that the depth of the water has decreased greatly in the last few years. Though fluctuation has been noted previously in the water levels of these lakes, it has not been so severe. The lowering of the water has greatly increased the growth of plants in the littoral zone. This has, in turn, affected the fish, which are of great economic importance to the Indians. It is believed that the volcano, Parícutín, is responsible for this fluctuation.

We wish to record our appreciation of the civil authorities and scientific people of Mexico who were all most helpful in aiding us in our work. Particularly, we should like to mention Mr. José Zorilla, Director of the Limnological Station at Pátzcuaro; the President of the Municipality of Chapala, Mr. Rafael Cuevas Reyes; Dr. Roberto Llamas, Director of the Instituto Biológica, Mexico City; Dr. J. G. Harrar, Rockefeller Foundation, Mexico City; and Dr. Fries, U.S.G.S., Mexico City.

FERDINAND SICHEL, University of Vermont College of Medicine Grant No. 834 (1945), \$500. The role of potassium in conduction of the impulse in striated muscle.

In a previous report the rate of potassium loss from traumatized skeletal muscle cells was discussed. The muscle cells were injured by cutting a frog's entire sartorius transversely by two sharp cuts into three approximately equal parts. The rate of potassium loss by diffusion into a restricted volume of Ringer's solution was sufficient to account for conduction failure within a few minutes. Since the loss of ability to conduct involves the entire length of each fibre in such a short time, the possibility must be considered that the local trauma might have changed the entire surface of the fibre so that potassium would be lost through this surface everywhere, and not only through the cut ends.

Earlier microscopical observation of fibres with cut ends revealed no morphological changes except in the region of the cuts.

The normal impermeability to dyes such as phenol red likewise was maintained until the death of the fibre. However, changes in the ability of potassium ions to cross the membrane might occur without such visible effects. It was decided to investigate this by means of the methods described in the previous report. If the potassium ions were coming out mostly through the uncut surfaces because of changes in these due to a distant cutting, there should be very little difference in the rate of potassium loss in fibres cut once and cut three times. On the other hand if the loss were mostly through the cut ends, there should be a greater rate of loss with more cut ends.

The muscles were treated as before and were placed in restricted volumes of Ringer's solution. They were cut transversely either once or three times. The rate of accumulation of potassium ion in the medium was determined at various times by means of a flame photometer. It was found that the rate of leakage of potassium ions was much higher in the case of those muscles with three transverse cuts than in those with one. It is concluded therefore that the loss of potassium ion is entirely through the cut ends or, if there is any loss through the rest of the surface, this must be of a much smaller order of magnitude.

SICHEL, F. 1947. Report of progress. *Yr. Bk. Amer. Philos. Soc.* for 1946: 131-132.

SICHEL, F., and CHERYL PARKHURST. 1947. The role of potassium in conduction of the impulse in striated muscle. *Fed. Proc. Exp. Biol.* 6: 201.

HENRY K. TOWNES, Takoma Park, Maryland

Grant No. 855 (1946), \$300. Field work on the Ichneumonidae (Hymenoptera).

A car and camping and collecting equipment were taken from Washington, D. C., to Arizona and return. The time from April 7 to May 30, 1947, was spent in Arizona, with field work in the vicinities of Ajo, Sahuarita, Tucson, Young, Oak Creek Canyon, and Alpine. Approximately 8,050 specimens of Ichneumonidae were brought back for study. It is estimated that about 500 species are represented by these, of which about 325 are species or subspecies new to science. Many species represented previously in museums by scanty material were secured in some series. About 5,000 insects and arachnids of other groups were collected incidentally to the work of Ichneumonidae. All of these specimens have been mounted, labeled, and given a preliminary sorting.

Approximately 2,000 specimens, mostly other than Ichneumonidae, have been given to eleven specialists in ten institutions for use in their studies. Two additional lots of specimens are out on loan to other specialists. To date, reference to six of the species collected on this trip has been entered into manuscripts by the author.

GENETICS

CLARENCE WILLIAM CLANCY, University of Oregon

Grant No. 642 (1942), \$150. Development of eye color in *Drosophila melanogaster*: quantitative comparison of the red pigment in vermillion and cinnabar.

The mutants vermillion and cinnabar contain in their eyes a red pigment that can be extracted and measured by methods previously described.^{1, 2} On the basis of genetic, histological, and chemical evidence, these mutants contain only one, the "red" pigment, of the two pigment components characterizing the eye color of the wild type fly. One of the assumptions forming a basis for current patterns of thought^{3, 4} regarding eye color development in *Drosophila* is that the mutant genes, vermillion, and cinnabar, are unable to perform certain chemical functions carried out by their normal alleles in the chain of reactions leading to the formation of the "brown" pigment component. As a consequence, only the red pigment is formed resulting in the vermillion-like phenotype of these mutants.

The purpose of the present study was to check on an observation made in 1940 when measurements of the pigment from vermillion and cinnabar flies were made in connection with studies on the action of the mutant gene claret.¹ The data presented at that time suggested that the observed difference in the pigment content of the eyes of vermillion and cinnabar might be significant.

Experiments specifically designed to answer this point have been attempted several times but each time unavoidable interrup-

¹ Clancy, C. W., The development of eye colors in *Drosophila melanogaster*; Further studies on the mutant claret, *Genetics* 27: 417-440, 1942.

² Ephrussi, B., and Jean Lane Herold, Studies of eye pigments of *Drosophila*: 1. Methods of extraction and quantitative estimation of the pigment components, *Genetics* 29: 148-175, 1944.

³ Beadle, G. W., and E. L. Tatum, Experimental control of development and differentiation: Genetic control of developmental reactions. *Amer. Nat.* 75: 107-116, 1941.

⁴ Ephrussi, Boris, Analysis of eye color differentiation in *Drosophila*. *Cold Spring Harbor Symp. Quant. Biol.* 10: 40-48, 1942.

tions of the experiments have invalidated them. During the past few months, however, several series of measurements of the red pigment have been completed on the following stocks: vermilion, cinnabar, and the double-recessive combinations, vermilion-cinnabar, vermilion-claret, and cinnabar-claret. A comparison of the values (expressed as Photometric Density of the extracts) obtained for vermilion and cinnabar shows that cinnabar heads consistently contain a larger amount of pigment than the heads of vermilion flies. The same relation holds in the comparison of cinnabar-claret with vermilion-claret; the claret gene merely acting to reduce the absolute amount of pigment in each case. With respect to these two sets of comparisons statistical analysis of the data permit one to say that the difference of the mean values obtained is such that a difference this large would occur by chance less than one per cent of the time when actually no difference existed.

Not enough measurements have been made involving the double recessive, vermilion-cinnabar, to afford valid conclusions from the obvious cross comparisons to be made.

These results are at variance with those of Ephrussi.⁵ The conclusion with reference to eye color development is that the wild type allele of the vermilion gene is not only concerned with reactions leading to the production of the brown pigment component, but is also involved in some unknown way with the production of the red pigment.

JAMES F. CROW, Dartmouth College

Grant No. 913 (1947). Different susceptibility to drugs of several closely related *Drosophila* species.

Students of evolution and genetics who have worked with the *virilis* group of *Drosophila* have noticed great differences among the members of this group in the length of time required for anæsthetizing with ether. Since ether is not a drug with which a fly in nature normally comes in contact, one wonders how this apparently useless difference has happened to arise in the evolutionary history of the group. Information as to whether this difference is due to few or many genes and whether the factors for resistance to ether are also responsible for resistance to other

⁵ Ephrussi, Boris, Studies of eye color differentiation in *Drosophila*. *Yr. Bk. Amer. Philos. Soc.* for 1942: 150-151, 1943.

substances more likely to be a part of the usual environment of the fly might provide partial answers to the question.

Studies on the time required to kill 50 per cent of the flies at a constant concentration of ether vapor showed very pronounced differences. Of the three species studied, *D. virilis* was much the most resistant, *americana* next, and *texana* least. In all cases the females are slightly more resistant than the males.

When the time of exposure is plotted against the concentration required to kill a certain number (usually 50 per cent) of the flies, curves are obtained which become very close to straight lines when plotted as logarithms. These curves may be quite well approximated by equations of the form $tc^n = K$, where t is time, c is concentration, and K and n are constants. The numerical value of n is in the vicinity of 2.5 for all the species, and since this same value has been obtained by other workers in studies on ether effects in mice, some evidence is provided for believing that the mechanisms of the drug action are similar in flies and mammals.

The fact that the three species differ most at high concentrations and short times suggests that the apparent differences in susceptibility may be largely due to differing rates of uptake, owing perhaps to respiratory differences. Direct study of respiratory rates is planned.

Data from studies on the hybrids and backcrosses and for other drugs are too incomplete for a report at this time.

HILDA GEIRINGER, Wheaton College

Grant No. 875 (1946), \$600. Contributions to the theoretical genetics of multivalent organisms.

In a first study of polysomic inheritance the multivalent organism is considered with respect to *one* factor but under assumption of any number of alleles. A $2s$ -valent organism ($s = 1$ represents the ordinary or diploid case) possesses with respect to the character under consideration $2s$ genes of which s are transmitted in the formation of a new individual. (We assume discrete, non-overlapping generations and random breeding.) This segregation takes place according to a probability law. After a careful study of the results of observations on polyploids a "segregation distribution" is defined which is more general than for the usually assumed random chromosome segregation. By means of this segre-

gation distribution the "distribution of gametes" is deduced from the "distribution of genotypes."

It is then shown how the distribution of gametes in a generation can be derived from the analogous distribution in the preceding generation by means of surprisingly elegant "recurrence relations." Next these recurrence relations are "integrated", i.e. it is shown how to derive directly the gametic distribution in the n^{th} generation (n = any positive integer) from the distribution in the original generation without considering at all the intermediate generations. It is also proved that, not only for diploids but also for polyploids, the gametic proportions which correspond to each allele remain constant through the generations. Another result consists in the proof of the existence and determination of a genetic equilibrium status which will be approached more and more as " n " increases. There will be equilibrium as soon as, eventually, the r alleles are "independently" distributed. The rate of approach to this equilibrium is also determined.

In a second study polysomic inheritance is considered for "chromatid segregation." This shorter study is also finished and will probably be published in a biological journal.

Finally, the problem of linkage for polyploids has been studied along similar lines. There seem to be certain difficulties in adapting the theory to the observational results. The work is however well in progress.—As far as the biological theory was concerned investigations by R. A. Fisher, J. B. S. Haldane, and K. Mather have been used to particular advantage.

GEIRINGER, HILDA. 1948. Contribution to the heredity theory of multivalents. *Jour. Math. & Physics* 26(4): 246-278.

BOTANY

CHARLES A. BERGER, Fordham University

Grant No. 892 (1946), \$600. Polyploid divisions in the normal development of *Mimosa pudica*.

Tetraploid cells in division were found in the periblem of the roots of young seedlings of *Mimosa pudica*. An average of 40 such tetraploid mitoses was observed in 2 mm seedlings, the extremes being 20 and 110. The frequency of these divisions increases to a maximum in 4 mm seedlings where an average of 94 divisions per root and extremes of 25 and 170 were observed. No polyploid

mitoses were observed in seedlings 10 mm in length or in longer plants.

A paired arrangement of the chromosomes was evident in all the polyploid divisions in prophase and metaphase. This close pairing indicated that the tetraploid condition arose by a double reproduction of the chromosomes in the preceding resting stage and that this was the first division since the polyploid condition was attained. The absence of any tetraploid divisions in which the chromosomes were not in the paired condition indicated that the tetraploid cells divide only once as tetraploids before becoming differentiated.

Since the tetraploid divisions were found in seedlings 2 mm in length when the majority of the cells are undergoing their first division, it is probable that the polyploid condition arose during the early embryology of the plant. The normal developmental pattern of *Mimosa pudica* thus involves the formation of a certain number of tetraploid cells which divide once early in germination.

WITKUS, E. R., and C. A. BERGER. 1947. Polyploid mitosis in the normal development of *Mimosa pudica*. *Bull. Torrey Bot. Club* 74: 279-282.

HENRY PAUL HANSEN, Oregon State College

Grant No. 944 (1947), \$1,500. A study of postglacial forest migrations and climate in western Canada.

During July, August, and September about 7,500 miles were travelled in British Columbia and Alberta, collecting sections from peat bogs and other sites of organic sedimentation of postglacial origin. The sedimentary columns are being analyzed for their pollen content, from which will be interpreted the postglacial forest succession and climate of the region represented. A total of sixty-five sections from as many sites was collected.

It was hoped to obtain sections in each of the several phytogeographic areas of the region in order to reveal the recorded movements of these vegetation types in response to Postglacial climatic trends. In general, this end was fairly well obtained, although the prairie region of south central Alberta is poorly represented in the collection. Apparently the climate and the lithology of the area have been unfavorable for hydrarch succession resulting in the deposition of sediments suitable for pollen analysis. Hundreds of lakes and swamps were examined for pollen-bearing sediments, but apparently few or none exist in the region. Most of the organic

sedimentation has occurred in shallow, alkaline lakes resulting in cattail-bulrush swamps, in which the sediments are largely inorganic and with the organic fraction well oxidized. Examination of the sediments reveals a very low pollen content, which is also characteristic of this type of sediment in the Pacific Northwest of the United States.

In the general latitude of Edmonton, Alberta, and north, peat bogs or muskegs are abundant. In Alberta sections were obtained from bogs east of Edmonton and north to Athabaska, and then in a general westerly direction to Dawson Creek, British Columbia. A transect of bogs was sectioned west from Edmonton to Jasper in the Canadian Rockies. In British Columbia sections were taken from a transect of muskegs along the Alaska Highway from Dawson Creek to as far north as Watson Lake in the Yukon, and along the Cariboo Trail from Clinton north to Prince George and northwest to Hazelton. Sections were also obtained from south central British Columbia in the intermontane region in the vicinity of Revelstoke, Kamloops, Merritt, and Penticton, and from along the western edge of Vancouver Island.

The sections were taken largely from *Sphagnum* bogs most of which are of the muskeg type with an overgrowth of ericaceous shrubs consisting chiefly of Labrador tea. Principal arboreal species on the muskegs are black spruce, lodgepole pine, tamarack, and white birch. In the dryer areas sections were obtained from sedge bogs formed in depressions on floodplains. In general, these are deeper than the muskeg, although a few of the latter sampled were over five meters in depth. Some of the muskegs observed are of the raised type, having developed on almost level terrain. Only a few were found to be frozen at the bottom. Most of the organic sedimentation in western Canada has occurred in depressions on glacial drift of varying topography, although a few were noted in swales formed by blocked stream drainage and oxbows. Hydrarch succession on these sites has consisted largely of swamp stages, and contain a greater thickness of limnic peat than the muskeg.

A section through a bog about fifteen miles east of Edmonton reveals what may represent a postglacial muskeg overlying a pre-Late Wisconsin peat deposit. The site of the sediments lies several miles southwest of the Late-Wisconsin end moraines upon Early Wisconsin drift. It seems possible that a bog developed on the

Early Wisconsin drift and reached a mature stage of Sphagnum moss and ericaceous shrubs. It was then covered with several feet of sand and silt from the Late Wisconsin meltwater. With the recession of the Late Wisconsin ice, organic sedimentation began anew, going through the several stages of hydrarch succession to reach the present Sphagnum moss-ericaceous shrub stage. The presence of Early Wisconsin moraines between the site of sedimentation and the Late Wisconsin end moraines may have prevented the depression containing the pre-Late Wisconsin sediments from being destroyed or completely buried. It is hoped that pollen analysis will substantiate this hypothesis.

The occurrence of a volcanic ash stratum in most of the bogs in Washington has proved to be of great importance as a chronological indicator and correlator. Several sections from south central British Columbia contain a layer of ash which is probably of the same source as that in the Washington sections, namely Glacier Peak. Two sections from Glacier National Park also contain an ash stratum which probably came from the same volcanic activity. In the Cariboo region, ash or fine pumice from a different source occurs in several peat sections, which may prove to be of more regional distribution upon microscopic examination of the other sections.

More than half of the sections have been prepared for microscopic analysis and pollen analysis is under way. So far, pollen analysis has shown that pollen grains are abundant in the organic sediments but scarce in the underlying clay, silt, and sand. Apparently vegetation was very sparse in the region for some time after recession of the ice.

About 1,500 specimens of plants were also collected which have been deposited in the Oregon State College herbarium.

GEORGE R. PROCTOR, Academy of Natural Sciences
of Philadelphia

Grant No. 74—Johnson Fund (1947), \$200. Ecological study of a group of ferns: *Dryopteris cristata* and its relatives in eastern United States.

The group of fern variants related to *Dryopteris cristata*, as found in the eastern United States, has long presented a taxonomic problem of great difficulty.

Briefly, the *D. cristata* complex includes *D. cristata* itself, a circumboreal species of considerable uniformity over most of its

range; an intergrading and inconstant variant often known as *D. clintoniana*, limited to eastern North America; and a series of presumed hybrids with several distinct though related species within the same general range as *D. clintoniana*. The relationships of some of these intermediates, such as the forms known as *D. boottii*, *D. slossonæ*, and *D. cristata* x *spinulosa*, seem clear enough to cause no inconvenience to the conventional systematist. But another group of forms, centering apparently in the Dismal Swamp region of southeastern Virginia, cannot be disposed of so easily. This consists of the variable plant usually known as *D. celsa* and another of exceedingly sporadic known range called *D. atropalustris*. These, together with the various phases of *D. clintoniana*, do not lend themselves readily to conventional taxonomic treatment, and the writer has been attempting to devise methods whereby their origins can be ascertained and their present relationships unraveled.

During the summer of 1947 several collecting trips were made for the purpose of examining some of the more puzzling forms in their native habitats, with the idea that habitat differences, especially varying edaphic conditions, might have a bearing on the problem. The areas investigated included localities in New Hampshire, Massachusetts, Connecticut, Pennsylvania, Delaware, Maryland, and Virginia. Examination of many wild *Dryopteris* plants was made without disclosing any significant habitat features correlated with morphological variation. Collections of dried specimens were made at all localities visited; these are deposited at the Academy of Natural Sciences of Philadelphia. In addition, live plants were obtained wherever possible; these are now being grown under as nearly identical conditions as possible on the estate of C. L. Wiswall at Greenville, Delaware. It is hoped that eventually breeding experiments can be performed under controlled conditions, so that the hybrid origin of some of these plants can either be demonstrated or refuted. Hybridization may well be the crux of the situation with these plants, but the evidence is too ambiguous to be convincing on morphological grounds alone.

CHING TSAO WEI, University of Nanking

Grant No. 964 (1947), \$1,500. Studies on the seed-borne diseases of soybeans.

Samples of diseased soybean seeds were collected from Nanking, Chengtu (Szechuan), Sian (Shensi), and Peiping (Hopei) to repre-

sent situations in different parts of China. Isolations of the pathogens were made from seeds surface-sterilized with mercuric chloride (1-1000). Up to the present, 1,375 isolations were made and the kinds of pathogens found and their frequencies are as follows:

ORGANISM	LOCALITY			
	NANKING	CHENG TU	SIAN	PEIPING
<i>Alternaria atrans</i>	16	15	14	0
<i>Cercospora Kikuchii</i>	122	105	21	25
<i>Diplodia</i> sp.	0	6	0	0
<i>Gloeosporium</i> sp.	3	9	0	0
<i>Glomerella Glycines</i>	21	24	0	0
<i>Helminthosporium Vignæ</i>	24	9	0	0
<i>Helminthosporium</i> sp.	7	0	0	2
<i>Macrophoma mame</i>	8	15	2	0
<i>Mycosphærella Sojæ</i>	4	12	0	0
<i>Phomopsis Sojæ</i>	115	122	11	1
<i>Phyllosticta sojæcola</i>	16	21	1	0
<i>Rhizoctonia Solani</i>	11	6	0	0
<i>Fusarium</i> spp.	149	150	38	27
Total number of isolations	658	566	230	280

There are several points worthy of note: A species of *Diplodia* was isolated from seeds collected in Chengtu and the same fungus was found common in Wusih and Changchow (Kiangsu) to cause pod blight. The size of conidia is slightly smaller than that of *D. natalensis* to which it is closely related. Cross inoculations are in progress to determine their probable identity.

Helminthosporium Vignæ, as reported by Olive *et al.* in 1945 to occur only on soybean leaves, was isolated from diseased seeds and the fungus is proved to be identical with *Cercospora vignicola* described by Kawamura in 1931. So far as the morphology of the fruiting structures is concerned it is a border form. Further evidences are needed to determine to which genus it better belongs.

A new species of *Helminthosporium* was found and its pathogenicity to the seeds as well as to the leaves and stems of the growing plants has been proved by inoculation experiments.

Discosporella phæochlorina, first described by Wei and Cheo in 1942 on tomato, was once observed on diseased seed, but no iso-

lation yielded this fungus. Recently it was isolated from diseased leaves and artificial inoculations on pod and seed were successful.

It seems to be generally true that seeds from North China are less frequently infected from pathogens. It is suspected that the drier climate there is contributory to this difference.

PSYCHOLOGY

M. BRUCE FISHER, Fresno State College

Grants No. 338 (1939), \$125, No. 479 (1940), \$75, and No. 612 (1942), \$100. The influence of the surrounding retinal field on foveal function.

This study was undertaken to develop further the hypothesis that the effect of one illuminated area on the function of another was in part the result of the diffusion of some process in the photosensory products of one area to the other. The assumed difference in the order of magnitude of the time required for the diffusion effect and any neural interaction effect to make themselves evident was the basic element in the experimental design.

Monocular critical flicker frequency was measured in a test object having a radius of one degree of visual angle. A pair of threshold measurements was made by the method of limits every 20 seconds and such measurements were made continuously for 16 minutes. In the first 5 and the last 5 minutes of the 16, the test object only was illuminated; in the middle 6 minutes a field surrounding the test object was also illuminated. Test object brightness was 5 candles per square meter; the surrounding field was illuminated at levels of 100 and 1,000 candles per square meter.

Two shapes of surrounding field were used with each level of illumination: a circular area, with a radius of twenty-one degrees of visual angle, and with the test area at its center; and an annulus, separated by an eight-degree dark space from the test area, and having the same outside diameter as the circle. Four subjects were measured three or four times for each of the four shape and illumination conditions of the surrounding field, and for control conditions in which the 16 minutes of measurements were made without illuminating the surrounding field.

Preliminary analysis of the data indicates they are in harmony with previous findings by a different method with regard to the fact that some facilitative process is operative which does not

reach its maximum until 2 or 3 minutes after the surrounds are illuminated. The effect of this process is a small gradual increase in critical flicker frequency, not nearly so large as the initial increase, presumably dependent on neural factors, which occurs immediately on illumination of the surrounding field.

FISHER, M. BRUCE. 1941. Report of progress. *Yr. Bk. Amer. Philos. Soc.* for 1940: 169-170.

—1941. Time relations in the effect of a surrounding field on foveal critical flicker frequency. *Jour. Exp. Psychol.* 29: 483-496.

EDWARD GIRDEN, Brooklyn College

Grant No. 894 (1946), \$1,500. Phylogenetic comparison of experimental drug dissociation.

The curare-dissociation effect was first reported in 1937 by Girden and Culler. The conditioned reflex (CR) technique was used: after a training series of sound followed by electrical reinforcement on each trial, the single muscle (*M. semitendinosus*) contracted to the acoustic stimulus alone. The demonstration of the dissociation lay in the fact that the CR in the curarized dog (supported by artificial respiration) was confined to that situation; upon recovery to the normal, the CR was repressed, to reappear only upon recurarization. Conversely, the CR established in the normal animal was never evoked in the drug-state.

Since the first studies, observations were made in a great number of animals to determine the nature of the behavior pattern in the *intact* animal and, most recently, phyletic comparisons also have been obtained. As in normal learning employing shock-reinforcement, the CR was a complex pattern involving the striated muscles and autonomic activity (e.g., pupil, pulse, and blood pressure). The amount of muscular response was a function of the peripheral effect; i.e., degree of myoneural block between motor nerve and muscle. With complete paralysis, conditioning of autonomic components alone still proceeded regularly in the curarized mammal, and this CR was also subject to the dissociation. From our most recent researches, it is clear that this effect is not peculiar to the dog, but that the dissociation occurs in the entire mammalian scale from rat to monkey.

In our first studies in 1937 it was found that the threshold at the cerebral motor cortex for innervation of minimal muscular response was poorer in the curarized animal. Supported subse-

quently by extirpation studies, the hypothesis was developed that the normal-CR was cortical and the curare-CR subcortical in locus. In 1943 we reported that the spontaneous activity of the cortical neurones, as indicated by the electroencephalogram (E.E.G.), however, continued unimpaired in the curarized dog and monkey. We have now supported these observations with a considerable number of tests in cats and rats. The E.E.G. was recorded with a three-channel Traugott electroencephalograph, with monopolar electrodes in frontal, auditory, and visual areas of the cerebral cortex. The animals were prepared first (tracheal cannulation, insertion of E.E.G. electrodes) under (*a*) ether, or (*b*) Dial anesthesia. The effect of curare (dihydro beta erythroidine hydrobromide) was then determined after the complete recovery from the ether, or immediately afterwards if Dial had been used. In both series terminal tests were made with pentobarbital sodium (Nembutal) which regularly abolished the E.E.G. Both rats and cats were tested in the (*a*) and (*b*) sequence. While there may have been minor modifications in the form of the E.E.G., the initial observations of 1943 were completely confirmed: in the mammal the E.E.G. persists following curarization.

A number of control tests were made which would seem to explain discrepancies reported in the recent literature. In the rat, especially, respiratory difficulties readily occur and careful adjustment of artificial respiration is essential. Here, too, preliminary cannulation must be performed most carefully; seepage of fluid into the trachea will impede proper respiration and increase the possibility of cerebral anoxia. Reports of convulsions in curarized mammals are probably explained in terms of respiratory collapse. In the rat, if the interval between curarization and introduction of artificial respiration is unduly prolonged, the E.E.G. may be distorted, or permanently abolished, and in the monkey delay may result in death. If artificial respiration is initiated before intravenous curarization, then the transition is entirely peaceful.

Massive dosage, many times the size required for complete paralysis, will often distort or abolish the E.E.G. As we have noticed in the earlier work during the conditioning of blood pressure, the latter will undergo a severe drop following such dosage, resulting in a condition akin to "shock," from which the animal rarely recovers. Here, too, we are dealing with an artifact due

to an indirect, systemic, reaction. With smaller individual doses the animal can tolerate the same total amount without suffering impairment of function. Use of light initial Nembutal anesthesia, a procedure followed by some investigators, is a complicating vector best to be avoided; in sufficient dosage this drug is known and used to abolish the E.E.G.¹ Dial is equally effective without disturbing the E.E.G. and the best technique is to use ether, initiating tests after complete recovery. Our findings with both methods confirm the 1943 findings that the E.E.G. persists in the curarized mammal; this conclusion has independent confirmation.² The reports of the suppression of the E.E.G. in the curarized mammal, therefore, are probably best explained as artifacts.

The following conclusions seem warranted. Our initial observation of the reduced cortical excitability is the central counterpart of the classical peripheral curare effect at the motor-end-plate: i.e., increased synaptic resistance inter-neurally at the cortex, or from nerve to muscle at the myoneural juncture. The spontaneous metabolic activity within the neurone itself, as represented by the E.E.G., on the other hand, continues unimpeded. The data, as far as we have gone, present a consistent picture from rat to monkey with respect to the dissociation effect.

The report of the disappearance of the E.E.G. in the curarized frog has been confirmed by us but it is not clear that the offered hypothesis, as a direct action on the central nervous system, is the correct explanation.³ Life is maintained in the curarized frog owing to an accessory skin respiratory mechanism. Considering the results with curarized mammals under improper respiration, the effect in the frog may be an analogous metabolic artifact producing cerebral anoxia. Our attempts to test this in the curarized frog have thus far been fruitless; with artificial respiration or the injection of cytochrome-C, which by releasing stored O₂ might attenuate possible cortical anoxia, the E.E.G. failed to return.

Further study is being made of the fundamental relationship between the muscular and autonomic components of the learned pattern in the curarized mammal and a study is also to be made to

¹Bremer, F., Étude oscillographique des réponses sensorielles de l'aire acoustique corticale chez le chat, *Arch. Internatl. Physiol.* 53: 53, 1943.

²Everett, G. M., The effect of d-tubocurarine on the central nervous system, *Federation Proc.* 6: 101, 1947.

³Feitelberg, S., and E. P. Pick, Action of curare on the brain of the frog, *Proc. Soc. Exp. Biol. & Med.* 49: 654-655, 1942.

determine the nature of the dissociation process (non-curare) in humans.

The following are some of the published results on present and previous grants for research in this field:

- GIRDEN, EDWARD. 1940. Report of progress. *Yr. Bk. Amer. Philos. Soc.* for 1939: 217-219.
- 1942. Generalized conditioned responses under curare and erythroidine. *Jour. Exp. Psychol.* 31: 105-119.
- 1942. The dissociation of blood pressure conditioned responses under erythroidine. *Jour. Exp. Psychol.* 31: 219-231.
- 1943. Role of the response mechanism in learning and "excited emotion." *Amer. Jour. Psychol.* 56: 1-20.
- 1943. Effect of striated muscle paralysis with erythroidine upon the electroencephalogram (E.E.G.). *Proc. Soc. Exper. Biol. & Med.* 53: 163-164.
- 1947. Conditioning in curarized monkeys. *Amer. Jour. Psychol.* 60: 571-587.
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LORRIN A. RIGGS, Brown University

Grant No. 901 (1946), \$600. Electrical responses of the human retina to stimulation by lights of various wavelengths.

A contact lens is used to maintain a constant electrical contact between the cornea of the eye and a non-polarizable electrode. Continuous records are made of the difference of potential existing between this electrode and a reference electrode located elsewhere on the head. When a light enters the eye, an electrical response occurs which is manifested as a momentary increase in the positivity of the corneal electrode. That the effects so observed originate in the retina or sensitive layer of the eye has been shown conclusively in various control experiments. The exact nature of the retinal events underlying the electrical response is not well understood at present.

The evidence from our recent experiments does show, however, that the scotopic or night visual system is chiefly responsible for the magnitudes and wave-forms of recorded responses. Responses obtained during the process of dark adaptation reveal, for example, that the sensitivity of the eye continues to rise over a period of more than an hour, even when tested with red light. The rate at

which visual sensitivity appears to rise in these experiments is consistent with the scotopic portion of the curve of dark adaptation as conventionally obtained by determination of visual thresholds.

In other experiments the eye has been adapted to a constant level of illumination, whereupon electrical responses are elicited by means of test flashes of added illumination. The result again is consistent, for five different levels of light adaptation, with the predicted effects of such adaptation upon the scotopic system of the retina.

In other experiments, various wavelengths of stimulating flash have been used to reveal the visibility function, based upon magnitudes of electrical response. This function resembles fairly closely the scotopic visibility curves which have been determined by many investigators using a conventional matching procedure.

It is concluded that the contact-lens method of recording visual sensitivity has the following characteristics: (1) It provides objective and measurable responses which are not influenced by errors of subjective estimation. (2) It reflects only the activity of the retina, uncomplicated by effects occurring in the higher visual centers. (3) It reveals the activity of the scotopic visual system under conditions of light adaptation such that scotopic functions cannot be observed by the usual psychophysical methods because of the intrusion of the photopic system. (4) In spite of the value of the electrical response as an indicator of scotopic sensitivity, its exact nature and point of origin are not well understood.

RIGGS, LORRIN A. 1947. Electrical responses of the human retina to stimulation by lights of various wavelengths. Abstract for Meeting of National Academy of Sciences, Washington, Nov. 19, 1947.

PHYSIOLOGY

GEORGE L. KREEZER, Institute for Advanced
Study and Princeton University
(Now at Cornell University)

Grant No. 952 (1947), \$690. Studies on the application of the concepts of servo-theory to biological systems.

The present series of studies was undertaken in order to determine the possibility of utilizing in biology concepts and methods derived from the theory of linear physical systems as exemplified

in servo-systems and electrical networks. The possibility of such application is dependent on the finding of analogues between the organization of systems dealt with in servo-theory¹ and those found in living organisms. The evidence that analagous problems and structures exist in the two fields suggests the possibility of using the powerful methods of one field (servo-theory) for investigation of the systems of the other. There are two directions in which such application is being attempted.

(1) The distinction made in servo-theory of systems of different types of dynamic organization provides a basis for an analogous classification of important biological systems. Three types of system for which there are important analogues among biological systems are: (a) the open loop system, (b) the closed loop system with fixed set-point, and (c) the closed loop system with variable set-point or input. Of particular interest are biological analogues of closed loop systems: physiological homeostatic systems (e. g., temperature regulation, blood-sugar regulation), which correspond to the closed loop systems with fixed set-points; and the systems underlying certain forms of adjustive behavior (e.g. tropisms, sensory-motor activities, and other forms of goal-directed behavior), which correspond to closed loop systems with variable set-points. In both types of system, the directiveness of biological activities is understandable from the fact that the responses of a closed loop system are determined by the difference between the set-point and the "regulated variable." Adjustive response will cease when this difference equals zero.

(2) The second direction of application involves an attempt to derive mathematical functions (transfer functions) to represent various systems. Such functions provide a basis for predicting the response of a system to arbitrary disturbances, and a guide for concrete experimental investigations of the nature of the components and their organization. The procedure used for obtaining such functions is the reverse of that customary in the field of physical servo-systems. In the case of these systems, the differential equation and related transfer function used to represent a given system can generally be written on the basis of the known structure of the system and the paramaters describing its components. In the case of biological systems, the internal organization and the nature of the components is generally unknown, and frequently cannot be

¹ Kreezer, G. L., Servo theory, in *Electronic Instruments*, ed. by I. Greenwood, Jr., Radiat. Lab. Tech. Series, 21: 225-355, N. Y., McGraw Hill, 1948.

determined by direct observation. The concepts of servo-theory suggest, however, a means for determining the transfer function of a system from empirically obtained curves showing the response of the system to special test functions (e. g., step functions and sinusoidal functions covering a wide frequency range). The transfer functions thus obtained indicate the organization of the system in terms of the time-constants of the component units.

During the period of the grant work has been carried out on the development of experimental techniques for obtaining the necessary types of response curve, and on the utilization of these techniques in the study of sample systems. An experimental investigation was made of the transient response of luminous bacteria to sudden increments in temperature, and related exploratory studies carried out on the rates of drug action, and of protein denaturation. The studies on protein denaturation are being carried further; it is expected that differences in the transient response curves may provide an index of differences in the structure of different proteins, in the site of operation of different denaturing agents, and means for continuously following the course of denaturation and its possible reversal.

Another line of work in progress involves the development of physical computing devices of the analogue type to aid in the derivation of transfer functions from different types of overall response curve. Two such devices are fairly well on the way to completion: one is an optical-electronic device intended to provide the Fourier transform of a given time function; the second is an electrolytic model intended to show the correspondence between a given set of time-constants in a system and its related frequency response curve.

KREEZER, GEORGE L., and ERNESTINE H. KREEZER. 1947. The form of the light-response of luminous bacteria to a sudden increase in temperature and its analysis as a transient. *Jour. Cell. and Compar. Physiol.* 30: 173-202.

—1947. The transient response of luminous bacteria to sudden temperature increments and related experiments on drug action and protein denaturation. *Biol. Bull.* 93: 197-198.

BIOCHEMISTRY

DENIS LLEWELLYN Fox, Scripps Institution of Oceanography,
University of California

Grant No. 916 (1946), \$840. Comparative studies of carotenoid biochromes in marine animals.

The research supported by this grant is part of an extensive general program concerned with the chemistry and metabolism of

biochromes in marine animals. Among the organisms under investigation within the project are the octopus, *Octopus bimaculatus*, the highly pigmented, autotomizing sea-star, *Linckia columbiæ*, and the red detritus-eating marine polychæte worm, *Thoracophelia mucronata*. The research is in collaboration with Mr. Sheldon C. Crane and with some assistance from Mr. Bayard H. McConaughy.

The sea-star, *Linckia*, is, like kindred asteroids, a carnivorous feeder although the nutritive sources of the rich and varied carotenoids in its skin and digestive diverticula have yet to be determined. Meanwhile, chromatographic and spectroscopic analyses have indicated that its skin contains at least five epiphasic carotenoids including alpha- and beta-carotene and some unfamiliar fractions. Six hypophasic carotenoids have been recovered including several which become acidic, as does astaxanthin from Crustacea, upon treatment with alkali in air. The digestive diverticula likewise yields several persistently epiphasic and a number of hypophasic acidogenic carotenoids.

In an attempt to throw light upon the animals' carotenoid metabolism, colonies of this species are being maintained upon diets of (a) carotenoid-free food (i.e. hog-liver), (b) meat containing carotenes (horse liver), (c) flesh of fish containing no carotenes but only xanthophylls, and (d) no food.

The octopus, which stores essentially all of its carotenoids in the "liver" or hepatopancreas, loses all such pigment therefrom when maintained for three or four weeks upon carotenoid-free flesh. In this manner it seems to resemble certain animals such as man and the frog in assimilating in its liver any carotenoid fed to it, e.g. alpha- and beta-carotene from horse liver, unchanged xanthophylls from fishes, etc. This condition is reflected in extracts of the livers of freshly caught specimens wherein carotenes and xanthophylls are accompanied by unstable acidogenic carotenoids derived presumably from a diet of crustaceans. Investigations are under way in an attempt to verify the source of these latter carotenoids. Xanthophylls and their esters, accompanied by acidogenic carotenoids, but not carotenes, are secreted along with melanin in the ink of *Octopus bimaculatus*.

The red beach worm *Thoracophelia* is in many ways the most interesting animal encountered as regards its carotenoid metabolism. This species contains hemoglobin not enclosed in corpuscles.

It ingests much sand along with the marine (mainly plant) detritus of its shore habitat. The beach sand of the worms' environment contains only some 0.7 per cent of organic matter (by ignition). Samples have been found to yield the following quantities of plant pigments calculated in mg. per 100 gm. of organic matter in the sand: chlorophyll 6: phaeophytin, 2.3; additional green pigment in the hypophasic extract, 3.6 (i.e. epi- and hypophasic chlorophylls totaling about 12 mg. per 100 gms.); beta-carotene 0.25; alpha-carotene 0.14; total xanthophylls 8.95 (chiefly fucoxanthin with smaller quantities of other xanthophylls). Thus some 96 per cent of the carotenoids in the worms' food are xanthophylls, but the worms store beta-carotene as the only carotenoid, and apparently not only reject the assimilation of xanthophylls, and even of alpha-carotene, but actually destroy them. The chlorophyll and all but small quantities of its green degradation products are also destroyed by the consumers. Beta-carotene is found in whole worms in quantities of about 0.30 mg. per 100 gms., and in the blood alone in approximately one-third this concentration.

Several yellow neutral non-carotenoid blue-fluorescent chromolipoid fractions are extractable, showing a generally increasing light-absorption in the visible spectrum proceeding from green through blue and into the violet, and commonly exhibiting single maxima in the region from 310 to 300 m μ .

A full account of the carotenoid metabolism of *Thoracophelia* is in preparation for publication elsewhere.

ALBERT P. KLINE, Washington College
(Now at Kirksville College of Osteopathic Medicine)

Grant No. 626 (1942), \$200. Studies on the specificity and sensitivity of certain colorimetric reactions of the amino acids.

In the YEAR BOOK for 1946, it was reported that of 175 colorimetric reactions of the amino acids 30 had been critically examined.

Fifty more tests have been examined by applying them to 18 of the amino acids. These tests were distributed as follows: 3 for alanine, 4 for arginine, 2 for aspartic acid, 2 for cystine, 2 for glutamic acid, 3 for glycine, 3 for histidine, 2 for hydroxyproline, 3 for isoleucine, 2 for leucine, 1 for lysine, 2 for methionine, 4 for phenylalanine, 2 for proline, 2 for serine, 2 for threonine, 6 for

TABLE 1
REACTIONS INVOLVING SOME AMINO ACIDS

The colors to be expected for different amino acids with each of the reactions are for Part A, red violet; Part B, ruby red; Part C, red; Part D, red violet. The per cents refer to concentrations.

The explanation of the symbols are as follows:

R—red or reddish
O—orange
Y—yellow or yellowish

B—blue or bluish
V—violet
G—green or greenish

T—tint
S—shade
SS—saturated solution

The final numbers refer to intensity of either shade or tint.

PART A									
Colorimetric Results Obtained by Subjecting 18 Amino Acids to Deniges' Reaction of Cystine									
ALANINE	ARGININE	ASPARTIC ACID	CYSTINE	GLUTAMIC ACID	GLYCINE				
.1% YOT ¹	.5% ROS ¹	1% OYS ¹	5% ROS ¹	1% GYS ²	1% YGS ¹	5% ROS ¹	1% GYS ²	5% ROS ¹	5% ROS ¹
HISTIDINE	HYDROXYPROLINE	ISOLEUCINE	LEUCINE	LYSINE	METHIONINE				
.1% RS ²	.5% OT ¹	1% YOS ¹	1% OYS ²	1% CYS ²	1% YOS ¹	5% ROS ¹	1% CYS ²	5% ROS ¹	5% ROS ¹
PHENYLALANINE	PROLINE	SERINE	THREONINE	TYROSINE	VALINE				
.1% YOS ²	.5% ROS ¹	1% GYS ²	1% YOT ¹	1% YOT ¹	1% ROS ¹	5% SS	1% YOT ¹	5% ROS ¹	5% ROS ¹

Cf. Deniges, G., Characteristics of l-cystine by coloriscopy, *Bull. Soc. Pharm., Bordeaux* 62:183-184, 1924.

PART B									
Colorimetric Results Obtained by Subjecting 18 Amino Acids to Okuda's Reaction of Cystine									
ALANINE	ARGININE	ASPARTIC ACID	CYSTINE	GLUTAMIC ACID	GLYCINE				
.1% OT ¹	.5% ORT ¹	1% ORT ¹	5% ORT ¹	1% SS	1% ORT ¹	5% ORT ¹	1% ORT ¹	5% ORT ¹	5% ORT ¹
HISTIDINE	HYDROXYPROLINE	ISOLEUCINE	LEUCINE	LYSINE	METHIONINE				
.1% ORT ¹	.5% ORT ¹	1% ORT ¹	1% ORT ¹	1% ORT ¹	1% ORT ¹	5% ORT ¹	1% ORT ¹	5% ORT ¹	5% ORT ¹
PHENYLALANINE	PROLINE	SERINE	THREONINE	TYROSINE	VALINE				
.1% RT ²	.5% ORT ¹	1% ORT ¹	1% ORT ¹	1% SS	1% ORT ¹	5% SS	1% ORT ¹	5% ORT ¹	5% ORT ¹

Cf. Okuda, Y. and Y. Nishijima. Zinc chloride nitroprusside reaction, *Bul. So. Fakultato Terakultura. Kyusu Imp. Univ.* 2:209-212, 1928.

PART C

Colorimetric Results Obtained by Subjecting 18 Amino Acids to Wurster's Reaction of Leucine

ALANINE	ARGININE	ASPARTIC ACID	CYSTINE	GLUTAMIC ACID	GLYCINE
1% RS	.5% R	1% ROT ¹	.5% R	1% OT ¹	.5% RS
HISTIDINE	HYDROXYPROLINE	ISOLEUCINE	LEUCINE	LYSINE	METHIONINE
1% OS ¹	.5% R	1% RS	.5% R	1% ORS	.5% R
PHENYLALANINE	PROLINE	SERINE	THREONINE	TYROSINE	VALINE
1% ORS	.5% R	1% RS	.5% R	1% ORS	.5% ORS

Cf. Wurster, C. Chinonals Reagens auf Amidosauren besonders Leucin und Sacrosin, *Zentral Physiol.* 2:590-591, 1888.

PART D

Colorimetric Results Obtained by Subjecting 18 Amino Acids to Neuberg's and Popowsky's Reaction of Tryptophane

ALANINE	ARGININE	ASPARTIC ACID	CYSTINE	GLUTAMIC ACID	GLYCINE
1% YOT ¹	.5% Y	1% YOT ¹	.5% Y	1% YOT ¹	.5% Y
HISTIDINE	HYDROXYPROLINE	ISOLEUCINE	LEUCINE	LYSINE	METHIONINE
1% YOT ¹	.5% Y	1% YOT ¹	.5% Y	1% YOT ¹	.5% Y
PHENYLALANINE	PROLINE	SERINE	THREONINE	TYROSINE	VALINE
1% YOT ¹	.5% Y	1% YOT ¹	.5% Y	1% YOT ¹	.5% Y

Cf. Neuberg, C. and N. Popowsky. An indoleaminopropionic acid and its halogen compounds (tryptophane reaction), *Biochem. Ztschr.* 2:357-382, 1906.

tryptophane, 4 for tyrosine, and 1 for valine. The method of examination was that previously reported.

Table 1 is included as an illustration of the results. This table presents the data obtained by the application of the following tests to 18 amino acids: Deniges' test for cystine, Okuda's reaction for cystine, Wurster's test for leucine, and Neuberg's tryptophane reaction.

Since many of the other 46 reactions give rather similarly inconclusive results, the previous tentative conclusion is further supported to the effect that not many of the tests found in the literature seem sufficiently specific or sensitive to prove of analytical value. Experience with these tests suggests that there is a need for the discovery and ordered arrangement of a unique series of chemical reactions by which each individual amino acid can be converted into a colored compound.

Reactions for Tryptophane

The Komm-Bohringer reaction was found to be the most satisfactory of the six tests examined from the point of view of specificity, sensitivity, reliability, and color yielded.

The test was modified and the accuracy improved by extending the time of standing for the test mixture to 45 minutes. This test can readily be used with the electrocolorimeter as the intensities of the shades of blue yielded by it are in proportion to the concentrations of tryptophane employed. The calibration curve is smooth. The presence of other amino acids, either singly or in a mixture, does not affect the color developed.

KLINE, ALBERT P. 1947. Report of progress. *Yr. Bk. Amer. Philos. Soc.* for 1946: 116-119.

CLASS III. SOCIAL SCIENCES

AMERICAN HISTORY

WILLIAM EUGENE HOLLON, University of Oklahoma

Grant No. 866 (1946), \$500. Study of Zebulon Montgomery Pike.

Materials have been gathered from the Library of Congress, National Archives, Pike Family Association, State Historical Societies, private collectors, and early newspapers in an effort to write a complete biography of Zebulon Montgomery Pike.

Four events in the General's life are outstanding: his expedition to the source of the Mississippi River in 1805-1806; his expedition to the source of the Arkansas in 1806-1807 and subsequent capture by the Spaniards near Santa Fe; his association with the notorious General James Wilkinson, a collaborator with Aaron Burr and the Southwest Conspiracy; his participation in the siege of York (Toronto, Canada) in the War of 1812 at which time he succeeded in capturing the fort, but was accidentally killed by an explosion of the British ammunition depot.

It was discovered that several short sketches of the General's life have been written in the past century and a quarter, but none are complete and some are highly inaccurate. Pike has been severely criticized on the one hand and fervently defended on the other by historians and writers ever since his Southwest expedition in 1806-1807. Some contend that he was a spy and stooge of the nefarious Wilkinson, while others praise his character and patriotic devotion to his country, and conclude that he was absolutely ignorant of the Wilkinson-Burr affair.

A careful study of the evidence against Pike has been made by this researcher to determine objectively his motives in allowing himself to be captured by the Spaniards near Santa Fe in 1807. If he is condemned as a traitor, it must be done solely upon circumstantial evidence. In view of his long service to his country, his character and personality as expressed in his correspondence to his friends and family, and the manner in which he met his death, it hardly appears possible that he was capable of knowingly committing an act of treachery. His greatest fault lay in his unflinching admiration of the "glamorous" General Wilkinson, the man who gave him his opportunity to obtain promotion and fame.

The evidence against Wilkinson at the Burr conspiracy trial in Richmond, Virginia in 1807 left little doubt in the mind of the general public that Wilkinson was a scoundrel. Pike's insistence that his friend was innocent has caused his own integrity to be questioned. His life-long admiration for Wilkinson was unusual.

The biography of Zebulon Montgomery Pike will be completed during 1948 and is scheduled to be published by the University of Oklahoma Press.

HOLLON, WILLIAM EUGENE. 1947. Zebulon Montgomery Pike and the Wilkinson-Burr conspiracy. *Proc. Amer. Philos. Soc.* 91: 447-456.

—Zebulon Montgomery Pike's lost papers. 1947. *Miss. Valley Hist. Rev.* 34(2): 265-273.

RICHARD B. MORRIS, Institute for Advanced Study

Grant No. 1000 (1947), \$2,500. The convergence of freedom and bondage in ante-bellum America.

While research on this subject is still in progress, it is now possible to define the objectives more precisely and to offer some tentative conclusions.

This study will emphasize one phase of the labor problem in America, 1783-1865—the extent to which mechanisms of compulsion, legal or economic, were employed for the control of the labor system in those areas where free, bound, and slave labor existed side by side. This region, loosely referred to as the "South," includes certain border states running as far North as Delaware, where, according to the Census of 1860, slavery still existed.

The results of the investigation of the legal and economic materials to date tend to show that in this region there existed a shadowland wherein dwelt a significant portion of the labor population, both negro and white, in a status neither slave nor free, and in many respects comparable to the wage-earning slave of ancient Greece, upon whose status much light has been shed in recent years by the investigations of Professor William Linn Westermann. As a matter of fact, Professor Westermann's studies for the classical period of antiquity have served as the point of departure for this investigation into ante-bellum labor in America, distinguishing it from previous analyses of slavery or the labor problem. In developing this concept, I have stressed research techniques emphasized in my previous study, *Government and Labor in Early America*, and have turned my chief attention to

unpublished inferior court records, to deeds, wills, manumission books, labor contracts, and business papers. The records of the court of general sessions for all available South Carolina counties have already been examined, and representative counties have also been studied for Georgia and North Carolina. During the latter phases of this research the inferior court records of Louisiana and Tennessee will also receive close attention.

As a result of the overemphasis upon the statutes characteristic of numerous studies of slavery and the failure of students of the problem to ascertain the law-in-action, certain stereotypes have been accepted as representing the system of slavery. But behind the façade of the statutes were the customs of the plantations, the mores of the towns, and the personal convenience of most slaveowners, who might continue to give lip-service to the statutes and yet find it to their advantage to enlarge the amount of quasi-freedom granted to their slaves. In many important respects slavery was an evolutionary system. Despite waves of repressive legislation, to a great extent ignored, an important percentage of the slave population, not fully emancipated, enjoyed various forms of nominal or quasi-freedom, held property, received wages, made contracts, and possessed a measure of mobility. This trend toward nominal slavery increased by the eve of the Civil War, especially in the urban areas and in the border states, despite the fact that most Southern states no longer permitted emancipation and in the face of the avowed hostility of state legislatures to the subterfuges resorted to by the slaveowners and the courts. In contrast, the free negro's position was definitely deteriorating; at times he appears to have retrograded to a state of servitude or quasi-slavery. To measure the quasi-freedom and quasi-slavery of these groups, this investigation is testing the rights of slaves and the free negro class to control property, to exercise occupational choice, the limitations upon their mobility, and the nature of their civil rights.

To the extent that proprietors of plantations exercised judicial authority in dealing with their slaves, this study of the official court records must be supplemented by materials illustrating plantation controls and discipline. Plantation papers available in the major Southern archival centers have already been examined in substantial part, and attention has also been given to strategic newspaper sources.

It is the approach of this study that too much emphasis has been placed in the past upon the slave as a peasant and not enough upon the slave as a proletarian. With this in mind special attention is being devoted to the problem of controlling slaves, as well as white labor, in urban centers, in factories, and in mines, and the legal and social conditions prevailing therein are being contrasted with those obtaining in plantation areas. To determine the position of the slave as a proletarian worker, city court papers, such as the Richmond, Virginia, Hustings Court, and the Annapolis Mayor's Court, are being examined, as well as newspaper files and the business papers of textile firms (notably the Gregg Papers at the University of South Carolina), the iron forge and coal-field papers and ledgers at the University of Virginia, and the tobacco factory papers at Duke University. To date, indisputable evidence has been obtained of the payment of overtime and incentive wages to slaves in industry.

The material already examined lends little support to the widely-held view that white labor was inconsequential in the South because of the absence of industrialization. To a considerable degree white labor operated in certain areas under various forms of compulsion. Indentured servitude of the colonial pattern survived in the ante-bellum period and was extended from the older seaboard states to the newer states of the Southwest, where, in addition, peonage was introduced from old Spanish and Mexican practices. These forms of compulsion under which white paupers, vagrants, debtors, *et al.*, worked out their obligations provided the framework for the neo-slavery which the Black Codes of Reconstruction days established for the ex-slaves. In fact, this study will serve to emphasize the continuity of the institutions of compulsory labor from colonial times down to very recent years. A calendar in course of preparation of the petitions of servants and slaves in ante-bellum Delaware will demonstrate that white servants and negro slaves for terms of years, as well as so-called free negro servants, all worked under various forms of peonage or servitude down to a very late period. The dockets of the Baltimore City Jail are also providing corroborating evidence that, not alone runaway slaves, but also servants, absconding seamen, and debtors raised similar issues of controlling the mobility of the worker.

This study is also seeking to determine to what extent labor groups in the South took concerted action for economic ends along

the lines of trade unions in the North. This phase of the labor history of the South is completely neglected in the extant labor histories for the period. Evidence to date indicates that the Southern states were reluctant to follow *Commonwealth v. Hunt* (1842), the Massachusetts decision legalizing concerted action by trade unions, and that collective action on the part of white workers to improve working conditions or to curb competition by negroes was discouraged. Nonetheless, this investigation is bringing to light substantial manifestations of such concerted activity, both in the organized trades, such as the printers, and among unorganized common laborers, notably in railroad and construction enterprises. Business reports and newspapers are the chief source of information on this subject.

Finally, this study does not accept the conventional pattern of slavery, with its overemphasis upon cotton monoculture and upon labor conditions on the large plantations, by no means typical of agricultural production—a pattern drawn very largely from the records and recollections of the more literate planter, principally the big slaveowner of the Lower South. The sources being utilized in this investigation illumine the problem of the smaller slaveowner, the yeoman farmer, and the “poor white,” and present the point of view, so far as possible, of the laboring classes, both free and slave. For, beneath the stereotype of conformity, great divergences are found in practice. Accordingly, due weight is being given to geographical and technological differences, both from state to state and within the several states. To this end somewhat more attention than in the past is being given to the border states, to the cities and towns, to the manufacturing and mining areas, and to the regions specializing in cattle-raising, cereal products, hemp, etc. in order to correct generalizations about Southern labor too often derived from a specialized study of the cotton and rice-producing areas.

W. SHERMAN SAVAGE, Lincoln University

Grant No. 968 (1947), \$500. Negro in the history of the West since 1890.

This project was financed jointly by the American Philosophical Society and Lincoln University. The Negro in the West since 1890 is a continuation of the *Negro in the History of the West from 1830-1890* which is now in the hands of a publisher.

It has been realized by students of the West that there is little material available on the Negro in the western part of the United States. Some have gone so far as to say that he exerted little or no influence on the region. This study has for its purpose an evaluation of the material in order to ascertain what influence he has exerted on the political, economic, and social aspect of the West.

The greatest amount of the work on such a subject must be done in the great depositories of the West. The Henry Huntington Library at San Marino and the Bancroft Library at Berkley, California, are undoubtedly the best. The state depositories have much material but they have not yet been visited. The above libraries, the National Archives, and the Library of Congress have considerable material which will be valuable for such a study.

There have been Master theses here and there on a particular state which is of some aid in the location of material.

There has not been a complete study of this question. The general histories on the Negro are weak on the West and the effort to supplement this deficiency is the reason for the study.

The time last summer was spent in the great depositories mentioned above, gathering material. The study is not far enough along to draw conclusions and thus nothing has been printed on this phase of the work. The first part should be printed before long and when more has been done on this phase it will be printed in monograph form.

POLITICAL SCIENCE

OSCAR JÁSZI, Oberlin College

Grant No. 958 (1947), \$2,000. Preparation of an essay, a series of articles, or a book on the fundamental changes which have occurred in the Danubian region.

This is a summary report on my journey to and in the Danubian countries which I carried out with the help of this grant, supplemented by another from the Social Science Research Council during the summer of 1947.

Political conditions were such that I was compelled to abandon my planned trip to Yugoslavia and Rumania. Instead of direct information I tried to collect data from foreign observers or émigré groups living in the adjacent countries. Needless to say that in this limited report I cannot enter into any detailed analysis. I can only state my main impressions and the problems of the future

from the point of view of my experiences. I hope to elaborate them later more fully.

My first stop was in London where I met several persons of the Hungarian colony, partly supporters, and partly antagonists of the present system. I heard the opinions of some English experts who follow with acute interest the Danubian developments. None regard the present situation as solidly established. Some Yugoslav émigrés spoke in despair of the suppression of any free movement in their country.

Arriving at Prague I found a very complicated and controversial situation. Though all the key positions are in the hands of the Communists, the democratic political form and ways of life still exist and the two other parties could muster a serious opposition should the Communists try to establish a dictatorship of the kind existing in the satellite states.

In this struggle Slovakia may play an important role, as it has a profoundly anti-Communistic, fervently Roman Catholic population. In the time of the crisis of the State a passionate Slovak nationalism developed for which a constitutional compromise inside of the unitary state cannot be easily found.

A very strong national consciousness coupled with a considerable development of the Slovak industry impressed me as an important element of the future. The recent past of the country is full of cruel memories. The "liberation of the country" by the Germans, the Magyars, and the Russians assumed the feature of constant civil war. The extermination of the Jews is one of the most atrocious chapters of Danubian history and the ruthless expulsion of the Magyar minority, following the Sudeten pattern, will not only hurt Czechoslovakia economically, but will impair the moral unity of the country for generations to come.

If the future of the Czechoslovak Democracy appears still problematic, there can be no doubt that Austria is the real last bulwark of Western economic and political life, in spite of the terrible agony of her starving population divided in four parts and menaced in her economic subsistence. The two solidly organized popular parties have established a strong united front against Sovietism. There cannot be any doubt, it seems to me, that, should the country become again solidly united and the conquering armies leave Austria, she would become both economically and culturally a living part of the democratic world.

Coming from Vienna to Budapest one finds an utterly different situation. Though the Hungarian capital is far more damaged than the Austrian, one does not feel that apathy and despondency which one observes at Vienna. The constitutional structure of the two countries is totally different. The quadruple division of Austria between rival governments makes a concentrated activity impossible, whereas Hungary is under the tight grip only of one government supported and directed by the Russian army. This government, in spite of constitutional slogans, is of a strictly totalitarian character. All the key positions are firmly in the hands of the Communists. The still existing parties of the opposition could be completely silenced in any matter which the Russians and their local delegates regard of essential importance for themselves.

This sad situation, however, has transitory advantages in the work of the physical reconstruction of the country. The communist leaders, especially those trained at Moscow, are masters of Machiavellian policy and are able to incite the most active elements of the proletariat to extraordinary performances.

This general situation leads to some weighty problems which will strongly influence the future of the Danubian countries. The four most important which should be understood in order to plan for our own future are: First, the growing strength and fanaticism of anti-semitic feeling in all the countries in which Jewry has played a preponderant part in the past. The virus of Hitlerism infects still public opinion in Austria, Hungary and Rumania.

The second is the fundamental fact that the new order has created in all those countries a *tabula rasa*, without any organic equilibrium. Feudalism was ruthlessly crushed, the bourgeoisie, always very weak, has become a subservient class through radical nationalization of industries, and the peasant class, even the landless proletariat for which the latifundia were rather planlessly divided, remained as they always were, simply silent tools of the new ruling class. The tragedy of practically all the able leaders of the peasantry shows that without the solution of this problem, the new Europe cannot find firm ground under its feet.

The third problem is intimately connected with the two previously mentioned. The smaller states "liberated" cannot survive in the Procrustes bed of their "national sovereignties" of which the Russian propaganda makes so much in their broadcast.

And there is also a fourth problem: the contrast between the West and the East. I have been convinced since long ago that the growing tension between the two worlds is primarily neither economic nor a frontier conflict (though motives of this nature are important elements in the situation). In my opinion it is fundamentally a conflict between ideas, moral values, and ideologies. It is almost a religious controversy. If a new war comes, it will be a "crusade" for ideas. My study trip has supported this conviction. Having talked with people of different races, classes, and social and intellectual standing about this problem in a territory known to me for a lifetime I did not hear a single well defined opinion which economic and political controversies should be solved in order to create peace.

These are the main results of my study, which I plan to elucidate in articles and perhaps in a small book about the psychological background of the situation.

ECONOMICS

ANNE BEZANSON, University of Pennsylvania

Grant No. 918 (1947), \$2,000. Study of wholesale commodity prices in Philadelphia during the Revolutionary War.

During the past year materials for the study of prices in Pennsylvania during the Revolutionary period have been gathered from the files of the Historical Society of Pennsylvania, and from the following collections in the Congressional Library in Washington: Ephraim Blaine Papers, Stephen Collins & Son, Robert Morris, John Davis, Matthew Irwin, John Pringle, Oliver Pollock Papers, DuSimitière Papers.

Price series of some commodities have been filled in and index numbers computed. There still remain many gaps, however, in the crucial years 1777 and 1778 which may be improved by use of data in the National Archives, or at Swarthmore, Haverford, Princeton, or some of the upstate Pennsylvania historical societies. The collection of the Philadelphia material from merchant papers, public papers, and letters of important men of affairs has been substantially completed.

In working with the data, it has become clear that the materials will be used to the best advantage if written up under groupings which show the course of prices of domestic staple foods, of repre-

sentatives of commodities especially needed for fodder, of West India goods dependent upon shipping, and of iron both pig and bar. There are also a number of other commodities with less complete records, for example those needed in armament such as lead and powder, which will be given some more general treatment.

Although data are still being collected, on the basis of those now available it has been possible to write first rough drafts of several sections. One on the important domestic staples, wheat, flour, and bread, has been written to the period when inflation ended. These commodities are significant not only because of their extensive use as foodstuffs but also because of the numerous quotations in both specie and continental currency which it has been possible to obtain.

A section has been started on the problems in the manufacturing of domestic supplies, to be used in contrast with the history of supplies being imported from Europe, either directly or by way of the West Indies.

Of the West India products, sugar and coffee have been analyzed, but there are still important gaps to be filled in, especially in molasses, before the writing of the whole section on West India products can be undertaken.

Included in this preliminary writing is the very important section on pig and bar iron—a domestic manufactured product—for the entire period 1770 to 1790.

From the information on prices, it is expected that a significant chapter can be written on the inflation of the Revolutionary period. The first years of these data have also been examined and a statement drafted.

Prices of salt, which in many ways was as important in the life of this period as were supplies of ammunition, are not yet in satisfactory usable form, nor are the series for beef and pork which have to be considered separately as well as in combination with salt and other commodities.

A new record, unknown to us at the time the study was started and never before available, was found in the files of the Historical Society of Pennsylvania in the course of some of their work, and was turned over to us. The material has been collected and tabulated and will give a precise record for the prewar period of the various areas from which vessels were entering the port and the effect of prewar embargoes upon trade. Along with the prices, it will show the dependence of colonial Pennsylvania upon trade with

southern Europe and with the West Indies, as well as with Great Britain and parts of northern Europe.

With the progress made this year, it is estimated that the study can be completed in another year.

WALTER GALENSON, Harvard University

Grant No. 967 (1947), \$1,000. Study of industrial relations in Norway.

The Society's grant enabled the recipient to perform field work in connection with a volume in preparation dealing with the labor movement and the industrial relations system of Norway. Of primary importance were personal interviews with government officials, trade union leaders, and prominent employers. Through these interviews it proved possible to clarify a number of questions concerning the actual functioning of labor institutions in contrast to their formal structure and purpose.

It was also possible to examine some of the novel economic arrangements through which Norway is seeking to superimpose planning upon a fundamentally capitalistic system. This was essential to an understanding of current labor relations. Current acceptance of compulsory arbitration by the labor movement, for example, is intelligible to one familiar with the history of Norwegian industrial relations only when viewed against the background of this new economic order. Of particular interest was the Norwegian National Planning Budget for 1947 which was discussed at some length with planning officials.

The recipient was also able to attend sessions of the Wage Board (Lønnsnemnd) which is entrusted with the final adjudication of all wage disputes; to observe the process of "compulsory" government conciliation; to visit several industrial establishments for the purpose of clarifying some of the complexities of the Norwegian wage system, with its combination of "standard" and "minimum with personal increment" provisions. A systematic search for relevant literature unearthed considerable material not hitherto available in the United States, including a comprehensive history of the Norwegian trade union movement to 1925.

The recipient also spent several weeks going through the collection of the Labor Movement's Archives in Oslo, which not only contains a wealth of material on the Scandinavian labor movement, but also constitutes one of the best remaining sources of information on the European socialist movement in general.

It is hoped that the volume so materially furthered by the Society's grant will be published early in 1948.

JURISPRUDENCE

ADOLF BERGER, *École Libre des Hautes Études*, New York

Grants No. 864 (1946), \$1,000, and No. 957 (1947), \$1,500. Encyclopædical dictionary of Roman Law.

The purpose of this Latin-English Dictionary of Roman Law is to give not mere translations but explanations of the specific juristic meaning of legal terms in all fields of Roman legal life, concise descriptions of legal institutions and their basic rules as well, a survey of Roman legal sources and science, together with an extensive bibliography. Certain parts have been accomplished thus far. As far as the bibliography is concerned, the General Bibliography which forms a separate part of the Dictionary, is in some sections quite completed, namely: List of abbreviations, Collective works, Periodicals and bibliographical works, General treatises, Roman Law in literary sources, General problems, Public Law, Roman Law in the Anglo-American world. For the other sections of this part of the bibliography the collection of material is nearly completed. Supplements resulting from current publications are constantly added.

The special bibliography attached to single important items as jurists, statutes, sources, legal institutions, and terms is composed in about 80 per cent and is to be supplemented by references to foreign literature, particularly that from Italy, France, and Germany. Books and periodicals published since 1940 in Germany begin to arrive just now, although yet not very regularly.

The encyclopædical part of the Dictionary is elaborated nearly 40-50 per cent. Articles belonging to some sections as Public law, Procedure, Sources, Jurists, are nearly completed. An exact evaluation is actually not possible because the single items are elaborated in systematic connection, and not in alphabetical sequence which will be the final one. Therefore, in the midst of several thousands of slips a precise estimation of what has been done and what is still missing, is extremely difficult.

The card register contains now about 5,000 items. In spite of the larger basis of the Dictionary owing to the inclusion of many

terms of the Roman public and administrative law, the work which presumably will have 400-450 pages is proceeding according to the original schedule and will be achieved in the late fall of 1948.

In connection with the preparation of the bibliographical part of the Dictionary particular attention was given to Anglo-American literature on Roman Law and related sciences. In this connection bibliographical material was simultaneously collected with regard to studies concerning Greek and Greco-Egyptian law. The results of this particular research work, made with the participation of Professor A. Arthur Schiller of Columbia University Law School, were recently published in *Seminar*, as indicated below.

Similarly the study of new comprehensive works connected with some special topics of the Dictionary gave the initiative for several reviews of which that of Taubenschlag's *Law of Greco-Roman Egypt in the light of the papyri* may be mentioned.

BERGER, ADOLF, and A. ARTHUR SCHILLER. 1947. Bibliography of Anglo-American studies in Roman, Greek and Greco-Egyptian law and related sciences. *Seminar*, An annual extraordinary number of the *Jurist* 5: 62-85.

CLASS IV. HUMANITIES

PHILOSOPHY

PHILIP P. WIENER, City College of New York

Grants No. 808 (1945), \$1,000 and No. 912 (1947), \$500. Evolutionism among the founders of pragmatism.

Further evidence of the influence of the idea of evolution discussed by the members of the so-called Metaphysical Club at Harvard around 1870 was presented in my introduction to "The Peirce-Langley Correspondence and Peirce's Manuscript on Hume and the Laws of Nature" published in the PROCEEDINGS of the American Philosophical Society.

Fresh material on the neglected figure and legal writings of Nicholas St. John Green was obtained, throwing new light on the beginnings of a pragmatic, evolutionary approach to jurisprudence among the lawyer members of Peirce's "Metaphysical Club," especially in view of their discussion of the historical and analytical approaches to law. Chauncey Wright's influence on these lawyers (Green, O. W. Holmes, Jr., Joseph B. Warner, and John

Fiske) as well as on William James and Charles S. Peirce, has been investigated further and the results embodied in a new chapter on Chauncey Wright as the precursor of pragmatism in the embryogeny of that many headed doctrine at Harvard.

These researches are now incorporated in the manuscript of my book on the *Founders of Pragmatism at Harvard: Their Views of Evolution* to be published by Harvard University Press. It contains eight chapters and appendices of unpublished documents of Chauncey Wright and Charles S. Peirce. Each chapter is devoted to the interpretations of evolution in the diverse fields cultivated respectively by the members of the "Metaphysical Club" and arising in part out of their mutual discussions: Wright (methodology of the natural and social sciences), Peirce (logic and cosmology), James (psychology and ethics), Green, Warner, and Holmes (legal history and jurisprudence), and Fiske (philosophy of history). Incidentally, in discovering and furthering the publication of the correspondence between Justice Holmes and M. R. Cohen (edited by Mark DeWolfe Howe and Felix S. Cohen for the *Journal of the History of Ideas* 9:3-52), new light is thrown on the sources of Holmes's "enlightened scepticism" in nineteenth-century scientific progress.

Though a second volume would be required for the twentieth-century development of the diverse forms of pragmatism (Dewey, Mead, Otto, C. I. Lewis; *et al.*) and its critical evaluation by A. O. Lovejoy and others, an attempt has been made in the final chapter of my book to indicate the common elements and cultural implications of the liberal philosophical legacy of the nineteenth-century founders of pragmatism and their views of evolution. Despite certain basic and candidly expressed differences among them, they all agreed in their high regard for the value of individual freedom of thought and inquiry as the indispensable basis of cultural progress.

WIENER, PHILIP P. 1947. Report of progress. *Yr. Bk. Amer. Philos. Soc.* for 1946: 181-182.

—1947. The Peirce-Langley correspondence and Peirce's manuscript on Hume and the Laws of Nature (At the Smithsonian Institution). *Proc. Amer. Philos. Soc.* 91: 201-228.

—1947. The pragmatic legal philosophy of Nicholas St. John Green (1830-1876). *Jour. Hist. of Ideas* 9:70-92.

ANCIENT, CULTURAL, AND LITERARY HISTORY

BRADFORD A. BOOTH, University of California, Los Angeles

Grant No. 911 (1946), \$750. An edition of the letters of Anthony Trollope.

Anthony Trollope (1815-1882), well-known English novelist, has been the subject of several biographical studies, but hitherto no attempt has been made to collect and edit his letters. Some 125 are printed wholly or in part in the most extended biography, that of Michael Sadleir. The present writer has been able to assemble about 900, nearly two-thirds of which are sufficiently important to warrant publication.

The nucleus of the edition is the collection of the late Morris L. Parrish, soon to be housed in a replica on the donor's library at Princeton University. Here there are 300 letters, as well as a small group of photostats of items from other sources. There is no other large collection except that still in the hands of the Trollope family. Miss Muriel Trollope kindly gave me access to the 83 letters in her possession and has accorded permission to publish any and all letters assembled. Five hundred letters have been gathered from miscellaneous sources. A personal letter was written to 300 libraries, booksellers, and collectors—with gratifying results. It is hoped that at least no substantial collection has been overlooked.

Since it is rather difficult these days to obtain information from understaffed English libraries, and since in a number of instances personal application to English collectors was recommended, I applied for and received a grant from the American Philosophical Society which enabled me to pursue my work abroad. As a result, 150 letters were thus assembled that could not otherwise have been obtained. A further desideratum was achieved through the grant; namely, the opportunity to use the British Museum and the Bodleian Library in tracking down obscure references. Many of the newspapers and periodicals for which Trollope wrote are not obtainable in this country, and proper annotation would not have been possible from this side. The typescript, now complete, has been called for by the Oxford University Press and is being read by them for publication.

For the most part, Trollope's letters are strictly functional, often indeed perfunctory, without stylistic embroidery or rhetorical

flourish. They are of a genre entirely different from Thackeray's, for example, and it is highly likely that Trollope was diffident about their appeal to general readers. It may perhaps be inevitable that a man who spent thirty-three years of his life in the Post Office should regard a letter unsentimentally as merely one of the modes of essential communication. Thackeray could afford to make personal letters a part of his creative life, an entity in pure literature. Trollope dispenses with embellishments. But his clean, simple objectivity is the characteristic quality of the best in applied literature.

That Trollope did not *always* put his literary best into his personal letters is perhaps unfortunate, but it assures the naturalness which we value in the type. He never tried to impress his correspondents with false dignity or false wit, with the far-sought allusion or the long-meditated quip. The letters are businesslike; firm, precise, pointed. If in their intense purposefulness they are different from those of his literary contemporaries, they are by no means without positive qualities of rare merit.

It is not to be expected, however, that Trollope letters will push their way into anthologies and "treasuries." They are not in the first place sufficiently dramatic. Further, they lack Walpole's infinite variety and undeniable charm, though they are free, of course, from his petty spitefulness. They do not have the stylistic grace of Lamb's or Meredith's, the ready facility of Stevenson's, the fecund imagination of Thackeray's, the amiable idiosyncrasy of Fitzgerald's. But that they will interest students of Victorian literature in general and admirers of Trollope in particular is the basic assumption of this collection. They are not weighted with Gray's occasional bad temper, Wordsworth's sense of moral responsibility, George Eliot's tension, or Dickens's egoism. And most of them have a biographical and critical relevance that makes them primary documents of the utmost importance for the full appreciation of Trollope's literary life and career. His relations with his publishers, with his literary contemporaries, with casual and with intimate friends are vividly recreated in a personal way. Trollope's correspondence is virtually a log book of the busiest man of Victorian letters. There are materials for the analysis of character that the biographer will find instructive. There are commentaries on Trollope's own work and on that of his contemporaries that the critic will find penetrating.

In these letters we watch Trollope in moments of frustration, of exultation, of irritability, of serenity, of turmoil, and of peace. Through the most merciless lenses, the examination of letters written with no thought of publication, Trollope appears man-size, without distortion. Like his characters he is neither seraphic nor devilish, neither much wiser nor more foolish than the generality of educated Victorians. But with the great kindness of spirit and the understanding compassion toward all men that grew out of his own early suffering, he peoples an imaginary county with men and women so sharply drawn with strokes of quiet humor and Horatian satire that his name has achieved a currency that would have amazed him. These letters will give us a fuller appreciation of his boundless activity, of his unaffected simplicity, and, perhaps, of his keen-eyed genius.

R. FLORENCE BRINKLEY, Goucher College
(Now at Duke University)

Grant No. 867 (1946), \$1,200. The seventeenth century as interpreted by Coleridge.

A survey of Coleridge materials accessible in America and in England has been made, and Coleridge's reflections on the seventeenth century have been transcribed. A number of microfilms and photostats were secured during the investigations made in England.

The survey reveals that Coleridge's comments on the seventeenth century are extensive and make a real contribution toward understanding various phases of the century, while at the same time they show seventeenth-century influences on his own thought and style. The purpose of this work is to bring together many widely scattered materials so that they may be readily available for the study of the century or for the study of Coleridge.

In the book being prepared the materials have been grouped under the following general heads: Prose style in the seventeenth century; Some writers of literary prose; History; Science; Philosophy; Theology; Poetry; Drama. Each division will be preceded by an introduction, and some of the introductions have been written. Short biographical sketches, some of which have been completed, will be provided for the individuals represented in the several divisions. Editorial work is under way.

An article entitled "Coleridge Transcribed" has been accepted for publication by the *Review of English Studies*, and a long

article on Coleridge and Locke is written and will be submitted to one of the American journals.

Some of the Coleridge material was incorporated in a paper called "A Poet Examines the Past," the December Phi Beta Kappa address at Duke University. A paper on "Duplicate Copies of Coleridge Manuscripts" was read before the Erasmus Club of Duke University, March 1948.

BRINKLEY, R. FLORENCE. 1947. Report of progress. *Yr. Bk. Amer. Philos. Soc.* for 1946: 188-189.

VERNAM HULL, New York University

Grant No. 960 (1947), \$800. Transcription and collation of texts in Irish manuscripts.

The grantee spent the summer of 1947 in transcribing a number of Irish texts from manuscripts in the libraries of Dublin. Some of these texts have not been published; others have been published but solely on the basis of one or more of the extant copies so that at present no critical edition of them exists. With a view to publishing the unedited texts and also to preparing critical editions of several of the texts which hitherto have not been edited on the basis of all the manuscript copies, the grantee made the following transcriptions: *Tochmarc Baisi Bandhruid*, MS. 23 N 10; [*Táin Bó Ruanaid*],¹ MS. 23 N 10; [*Scél Baisi Binnberlaig*], MS. 23 N 10; [*Uath Beinne Etair*], MS. 23 N 10; [*Mac Lesc and Finn*], MSS. C iii 2 and H.2.18; [*Cáin Domnaig*], MSS. 23 N 10 and 23 P 16; [*Anecdote concerning King Niall Frossach*], MSS. H.2.18 and 23 O 48; [*Echtra Cormaic Maic Airt*], MS. 23 E 29; [*Poem by Flannacán Mac Cellaich*], MS. H.2.16; [*The Battle Feats of Cú Chulainn*], MS. H.2.16; [*Geneamuin Chormaic Ua Chuind*], MS. H.2.16; [*Cath Belaig Duin Bolc*], MS. H.2.16; [*In Ceas Naigen*], MSS. H.2.16, 23 E 29, and B iv 2; [*Tucait Indarba Na n-Déssi*], MS. H.3.17; [*Aided Diarmada*], MS. H.2.16; [*Migration of the Ciarraighi*], MS. H.2.16; [*Mugron's Invocation*], MS. H.2.16; [*Aipgitir Crábaid*], MSS. 23 N 10, 23 P 3, 3 B 23, Phillipps 10266, H.2.16, H.4.22, and H.3.18.

In addition to the preceding transcriptions, the grantee likewise collated several texts with the originals in the manuscripts in order to verify the accuracy of the copies. Included among these

¹ Brackets denote that the manuscript or the manuscripts do not give a title.

texts was one which he himself has edited and which now is being considered for publication by the Modern Language Association of America. The texts that he collated were: *Longes Mac n-Uislenn*, MSS. H.2.16 and H.2.18; [*The Saga Lists*], MSS. H.2.18 and H.3.17; *Tucait Indarba Na n-Déssi*, MS. H.2.15.

OSCAR LEWIS, Washington University

Grant No. 922 (1947), \$500. Study of the Mexican village of Tepoztlán, Morelos.

A research project for the study of culture and personality in the village of Tepoztlán, Morelos, Mexico, was directed by the writer from September 1943 to June 1944.¹ The project was under the auspices of the Inter-American Indian Institute in Mexico with financial assistance from the Viking Fund of New York. The research was carried on with the aid of two Mexican agronomists from the Departamento Agrario and four students of anthropology from the Instituto Nacional de Antropología e Historia. One of the purposes of the project was to train Mexican students in modern field work methods in cultural anthropology.

Data were gathered on the social, economic and political life of the village and intensive studies were made of the following subjects: the history of the village since the Spanish Conquest as revealed in unpublished documents found in the National Archives in Mexico; the present-day agricultural economy, land tenure, and wealth distribution; the social and economic changes which have occurred in Tepoztlán since 1926 when Robert Redfield first studied the village.

In the personality study, life cycle material and individual and family case history material were obtained from numerous informants representative of all social and economic levels in the village. In addition the following psychological tests were administered to carefully selected children: The Grace-Arthur Performance Scale, Goodenough Draw-A-Man tests, Thematic Apperception, Emotional Response, Moral Judgment, and the Rorschach. Approximately 500 free drawings and written themes from school children were also obtained.

¹ Lewis, Oscar, Social and economic changes in a Mexican village: Tepoztlán, 1926-1944. *América Indígena* 4: 281-314, 1944; The Tepoztlán project: report on administrative and field problems (confidential report for the National Indian Institute, Office of Indian Affairs, Washington, D. C.), mimeographed, 1944.

With the aid of a grant from the American Philosophical Society the writer returned to Tepoztlán in the summer of 1947 to complete field research. Considerable time was spent in completing life histories of former informants and in filling in gaps in the earlier materials. One new and fairly complete life history was obtained with a soundscraper recording machine on fifty disks. Each disk contains approximately eight typewritten pages double-spaced.

A Mexican artist, Alberto Beltran, was assigned by the Departamento de Asuntos Indígenas to work up illustrative materials for the study. We now have on hand seventy drawings, including soil maps, topographical maps, barrio maps, drawings of house types, agricultural tools and techniques, and drawings of the people.

A two-volume work is planned. It is hoped that the first volume will be ready for press by the Fall of 1948.

LEWIS, OSCAR. 1947. Wealth differences in a Mexican village. *Sci. Monthly* 60: 127-132.

ARTHUR DARBY NOCK, Harvard University

Grant No. 926 (1947), \$300. Preparation of the third volume of the edition of the *Hermetica*.

A new text of the Hermetic fragments preserved in St. Cyril of Alexandria was prepared on the basis of photostats and the Latin version made by Oecolampadius from a lost manuscript. The text of the other Hermetic fragments and of the Excerpts preserved by Stobaeus was revised and so were the translation notes and introduction as prepared by my collaborator, A. J. Festugière, O.P. Most of the work is ready for the printer, subject to Festugière's revisions. A by-product of what was done with the aid of this grant will be appearing shortly in *Mélanges Fridrichsen* under the title "Word-Coinage in the *Hermetica*."

ANTONIO PACE, Syracuse University

Grants No. 791 (1945), \$650, and No. 858 (1946), \$300. (A) Relationships between the American Philosophical Society and Italian scientific societies, Benjamin Franklin and his Italian contemporaries, and (B) the American Philosophical Society and Italo-American cultural relations.

The following results of this study have been published:

1. Notes on Dr. John Morgan and his relations with Italian men and women of science, *Bull. Hist. Med.* 18: 445-453, 1945.

In 1764 John Morgan, early member of the American Philosophical Society, later director-general of hospitals and physician-in-chief of the Revolutionary army, made a tour of Italy. One extant section of his diaries contains references to distinguished Italian scientists whom he met. This article identifies the personages involved, elucidates the nature of Morgan's relations with them, and establishes that Morgan was made a member of the Arcadian Academy of Rome, a fact possibly not devoid of serious scientific implications. In general, Morgan's experience is a foreshadowing of the rather intense scientific exchange between Italy and the American Philosophical Society later in the eighteenth century.

2. The American Philosophical Society and Italy, *Proc. Amer. Philos. Soc.* 90: 387-421, 1946.

The emergence of the American Philosophical Society in 1769 aroused wide interest on the part of the Italians, who hailed it as a reliable source of information on the New World. The American Philosophical Society, thoroughly cosmopolitan in its orientation, included Italy in its sphere of activity. Exchanges of scientific material began early. Before the end of the century at least six Italian members had been elected, and Americans, notably Franklin and Benjamin Rush, began to grace the roster of Italian academies.

After the lull of the Revolutionary and Napoleonic period relationships were resumed, motivated to a large degree by the thwarted patriotic ambitions of the Italians and encouraged by the sympathetic Americans. American interest in Italy upon the achievement of national unity caused a new resurgence in relations after 1860. Since the end of the nineteenth century an increasing perfunctoriness has characterized the Italo-American exchange, as interpreted by documents in the archives of the American Philosophical Society.

The significance of the relationship between the American Philosophical Society and Italy is twofold. Intrinsically, it is a contribution of great interest and importance to the cause of international science. Extrinsically, the relationship offers sufficient continuity and substance to serve as a valuable barometer for the total historic Italo-American cultural exchange.

3. Franklin and Machiavelli, *Symposium* 1: 36-42, 1947.

A citation in one of Franklin's political pamphlets proves that he was acquainted with at least the *Prince* of Machiavelli. More-

over, the *Rules by Which a Great Empire May Be Reduced to a Small One* seem to be a satiric treatment of the *regimen principis* theme suggested by Machiavelli's masterpiece.

4. Another letter of Carlo Bellini, *William and Mary Quart.*, ser. 3, 4: 350-355, 1947.

The *Autobiography* of Thomas Jefferson has been the chief authority for the assumption that Carlo Bellini, the first regular professor of modern languages in this country, was given his post at the College of William and Mary in 1779. A letter of Bellini dated August 1778, buried in eighteenth-century gazettes, in addition to affording interesting commentary on other contemporary events, proves that the appointment took place before 1779, probably in 1778, during the governorship of Patrick Henry.

FRANKLIN AND ITALY

The two brief studies that have appeared to date on the subject of Franklin and Italy¹ do little to indicate the full extent of Franklin's influence in that country. A perusal of the unpublished Franklin papers, the obvious first step for a serious study of the connections of Franklin with Italy, revealed surprising facets of his cosmopolitan activity. Investigation in printed sources showed immediately that Franklin's impact upon Italy was more profound and lasting than one might have supposed. Some notion of the length of Franklin's shadow may be gathered from the results of an intensive bibliographical search: where the still standard Ford bibliography lists barely a score of titles connected with Italy, it can now be demonstrated on the basis of material available in the United States that no less than two hundred translations of Franklin's works and discussions of his life and writings have been printed in Italy.

The subject is clearly worthy of a book. Some of the projected sections at present in varying states of preparation are: the influence of Italy upon Franklin; Franklin's influence upon Italy as a scientist and inventor; his influence as a statesman; his relations with the Neapolitan publicist, Gaetano Filangieri; Franklin the moralist, and his role in the development and propagation of the bourgeois ethic in Italy in the nineteenth century; Franklin and

¹ L. Rava, *La Fortuna di Beniamino Franklin in Italia*, *Nuova Antologia* 221: 16-34, 1922; and E. Goggio, *Benjamin Franklin and Italy*, *Romanic Review* 19: 302-308, 1928.

Italian typographers; Franklin as a theme in Italian literature; Franklin as a theme in the plastic and graphic arts.

WILLIAM STANFORD REID, McGill University

Grants No. 820 (1945), \$400, and No. 938 (1947), \$200. Research in the life of Robert Barton of Over Barnton.

The first grant though made for 1946 could not be used until 1947 owing to the difficulty of obtaining transportation to the United Kingdom.

The period from June 20 to August 28 was spent in research part of the time in London and part in Edinburgh.

As a result of the work it appears that Robert Barton of Over Barnton, the subject of the research, was much more important during the reigns of James IV and James V of Scotland than was originally estimated. The available manuscript material on him is very large as he was much involved in both the economic and political developments of his own day. Indeed, because of the superabundance of material it was impossible to cover everything, particularly as there is also material on the Continent.

It was also discovered that apparently nothing has been done with regard to the economic developments of the period in Scotland. The whole question of the expansion of Scottish foreign trade, the resulting rise of the trading middle class and their political importance has not been as yet touched. A very considerable amount of material was unearthed dealing with this subject, and as a result it will be used for the purpose of making a study of the economic history of Scotland during the period 1500-1560.

The main collections of sources dealt with were: The Acts of the Lords of the Council, 1500-1525; Acts of the Lords of the Council and Session, 1532-1537; the Caprington and Tynningham letter books; miscellaneous customs records; Household papers and books of James IV, James V, Mary, Queen of Scots; and various notaries' protocol books.

HISTORY OF SCIENCE

THOMAS D. COPE, University of Pennsylvania

Grant No. 851 (1946), \$500. To prepare for publication the scientific background of the Mason and Dixon tradition in America.

Films have been deposited in the Library of the American Philosophical Society of the sources listed below:

1. Minutes of the Commissioners who represented Maryland and Pennsylvania in the Survey of the Boundaries, 1760-1768; original manuscript copy in the Land Office, Hall of Records, Annapolis, Md.
2. Field Books (two) of the Provincial Surveyors, 1760-1763; original manuscript copies in the Land Office, Annapolis, Md.
3. Charles Mason's Daily Journal, 1763-1768; original manuscript copy, National Archives, Washington, D. C.

These films have been studied in detail.

H. W. Robinson, Esq., Librarian of the Royal Society, London, England, has agreed to search for source material on England and to send copies of it to the Library of the American Philosophical Society. He has sent material from the records of the Royal Society, from Sir Joseph Banks's Notes on Proceedings of the Commissioners of Longitude, and from Greenwich Observatory. He has visited Oxford University and has a number of searches under way. Additional material is expected from him. This material is being studied. An exchange of letters with Mr. Robinson has been maintained since January, 1947.

Four invited addresses were given during the summer of 1947.

COPE, THOMAS D. 1946. Charles Mason and Jeremiah Dixon. *Sci. Monthly* 62: 541-554.

—1946. Charles Mason and Jeremiah Dixon. *Nature* 158: 381.

—1946. Mason and Dixon again. *Sky and Telescope* 5(12): 15.

—1947. Jeremiah Dixon? *Sci. Monthly* 65: 88.

—1948. Collecting source material about Charles Mason and Jeremiah Dixon. *Proc. Amer. Philos. Soc.* 92: 111-114.

THE EDITORS. 1946. The Mason-Dixon Line (editorial review of first article listed above). *Sky and Telescope* 5(10): 2.

ARCHÆOLOGY

HUGH HENCKEN, American School of Prehistoric Research

Grant No. 919 (1947), \$3,120. To investigate the prehistoric archæology of the Tangier area of Morocco.

This expedition examined numerous localities in the Tangier Zone. The net result of the work of Professor C. S. Coon of Harvard in 1939 and that of the American School of Prehistoric Research in 1947 makes possible a fairly complete picture of the cultures of the Tangier area from the last warm phase of the Ice

Age to historic times. This is sufficiently complete so that no further work would be justified. Tangier is the only area in northern Morocco where such work has been carried out. The following are the chief elements in the picture of the Tangier Zone. Unless otherwise specified, they are the result of the work of 1947.

Period 1.—During a part of the third and last interglacial period of the Pleistocene, the sea was eighteen meters higher in relation to the land than at present. Near Cape Ashakar were found gravels laid down by streams that had flowed into the eighteen-meter sea. In these gravels were five human tools, a cleaver and four hand-axes, that belong to the Acheulian period, one of the phases of lower Palæolithic. These are the oldest traces of man in the Tangier Zone.

Period 2.—Another site was related to the thirteen-meter sea that existed later in the third interglacial. This yielded large numbers of tools characteristic of the Middle Palæolithic. The culture has been tentatively classed as Levallois-Mousterian.

Significance of Periods 1 and 2.—The archæological importance of the Tangier Zone is that it forms the link on the migration route between North Africa and Europe. Cultures resembling those of Periods 1 and 2 are widespread in North Africa and Western Europe, but this is the first time that such material has been found anywhere in northern Morocco.

Period 3.—The High Cave on Cape Ashakar, largely excavated before the war by Professor Coon and his then associates, was further examined. In 1947 it was determined that the cave had been made by the thirteen-meter sea and that it had first been inhabited by man during the last Pleistocene glaciation. A rich Aterian Culture (Upper Palæolithic) had been discovered here in 1939 associated with the bones of elephant, hippopotamus, rhinoceros, and giraffe. With the Aterian some Neanderthal teeth were found in the previous excavations. This and the prior discovery of Rabat man indicate that another race than *Homo sapiens* existed in Morocco at this time.

In 1947 this cave was further excavated and another tooth, believed to belong to Neanderthal Man, was found. The floor of the cave, consisting of consolidated sand, was excavated to be sure that there were no older human deposits in it. None were found, but numerous bones of animals came to light which may help in fixing the age of the Aterian implements from the layers above.

The sequence of layers laid down on the cave floor also was verified by further excavation, and more Aterian flint tools were found.

The High Cave also had a rich Neolithic deposit, but this had been largely removed before 1939. The Neolithic here, a culture characterized by pottery and domestic animals, probably did not begin in North Africa before 4000 or 3000 B.C. A puzzling feature of the High Cave was that there was nothing between the Aterian and the Neolithic, giving the impression that several thousand years were not represented at all. Possibly the Upper Palæolithic lasted here much longer than is supposed.

Significance of Period 3.—The Aterian Culture from the High Cave also has parallels elsewhere. Its most striking feature, a kind of projectile point shaped like a laurel leaf and chipped on both sides, is found in North Africa from Morocco to Egypt, and has analogies, more or less close, in Spain and France in the Solutrean Culture. Mr. Bruce Howe, who was a member of the expedition, has made a partial investigation of Mediterranean and western European museums with a view to determining whether at this time western Europe was an extension of Africa or whether the reverse was true. He will complete his survey in 1949.

The presence of the teeth of Neanderthal man is also important. It is probable that this extinct race of men came into Europe from the east, and their remains are especially numerous in Germany, France, and Spain. It may be supposed that those found at Tangier had come over from Spain.

Period 4.—In two other caves were found stratified deposits of Neolithic material. This included quantities of pottery decorated with the impressions of sea shells, stone and bone tools, and the bones of domestic animals. There were also stone mortars, perhaps for grinding some edible substance. But there was no clear trace of agriculture. There being neither a Bronze Age nor an Iron Age in Morocco, the Neolithic lasted down to the Roman occupation in the first century, A.D.

Significance of Period 4.—The Neolithic Period was the first in which people abandoned the old hunting economy for food production. The ideas of food production and pottery making evidently started in the Middle East and spread in various directions through the Old World. One direction seems to have been along the North African coast from Egypt and from there into Spain and Western Europe. It would have reached Spain perhaps about 3000 B.C.

At any rate, the Neolithic of Northern Morocco, otherwise scarcely known before our excavations, has proved to be exactly the same as that of southern Spain.

Period 5.—The latest phase of culture that the Expedition discovered has been called "Berbero-Roman." This phase had not been noticed previously. It represented the continuation of the Neolithic (Berber) culture almost unchanged throughout Roman times.

Significance of Period 5.—This shows that in the Roman period, as today, Morocco was occupied by two social groups—natives and Europeans—each living a separate existence in their own communities.

C. T. HURST, Western State College of Colorado

Grant No. 920 (1947), \$350. Preliminary excavations at Cottonwood Cave and Pueblo, Montrose County, Colorado.

This is a preliminary report on archæological excavations carried out from August 2 to 16, inclusive, 1947. Two sites were worked. One, a cave site, was partially excavated and will need to be returned to next year for further work. This is due to two reasons: (1) the deposits proved to be much deeper than anticipated; (2) the site is of such difficult access that it was impossible to camp near it, and part of the personnel had to make the long and difficult trip each day which cut down the time for actual operations.

This cave was worked under permit from the Department of Agriculture and application will be made to continue the work in 1948. The application for the 1947 operations was filed November 25, 1946; the permit was dated December 30, 1946. The cave is located in the southwest quarter, Sec. 13, T 47 N., R. 14 W., New Mexico P.M., and on the North Fork of Cottonwood Creek, south of the Uncompahgre Plateau, in central Montrose County, Colorado.

The second site, a large Pueblo of four houses with additional walls forming a central and enclosed compound, was also worked on. One of the four houses was excavated completely. It proved to contain four rooms. This Pueblo is located on patented land of the Hill Ranch on Cottonwood Creek. Permission of the owner had been obtained for the work.

The camp was located on the same ranch, by permission of the owner. The Pueblo was located only a few hundred yards from the campsite, but the cave was about three and one half miles away. The personnel was divided between the two projects.

Since the 1947 excavations have yielded such interesting and pertinent results, we shall return to the same campsite in 1948 and continue with the work. Next year, we plan to uncover another house near to, but not in, the same Pueblo that was excavated in 1947. The cave will also be continued. In addition we shall excavate what appears to be a peripheral pithouse site near the campsite.

The personnel of the 1947 party included twelve people—four more than the usual size of our parties before we had financial assistance. The help extended to us by the American Philosophical Society has made the enlarged operations possible. In addition to the regular personnel, other paid individuals have contributed in various ways to the work.

The funds available have also made possible considerable scouting and travel in an accumulating general survey of the region. An extensive collection has been made of the surface artifacts of the region. These tell us what is present and what might be expected in future stratified sites. Everything is present in the area south of the Uncompahgre Plateau from Folsom-Yuma times to the modern Utes.

The final detailed report on the work accomplished this year will be published in the issue for June 1948 of *Southwestern Lore*, the official quarterly of the Colorado Archæological Society.

The 1947 expedition from the Museum of the Western State College of Colorado was the eleventh such expedition, and the ninth to the general area south of the Uncompahgre Plateau. The first two expeditions were to the San Luis Valley. It is felt that we have a definite field for operations in the Uncompahgre country that promises ultimate answers to many puzzling questions in southwestern archæology. This area is part of the great Northern Peripheral Area of the Southwest. It is more than possible that this area holds the answer to many questions regarding origins of more highly developed cultures to the South.

Cottonwood Cave (as we call the 1947 cave) yielded different patterns from those of any of the other three caves we have excavated in the Uncompahgre country. Tabeguache Cave revealed a

peripheral Basket Maker II culture. Tabeguache Cave II contained complex stratification in that it showed modern nomad material (Ute) underlaid by Basket Maker II in company with a contemporary nomad, and below all this a still earlier culture that we have named the *Tabeguache*. This latter is no doubt the expression of the postulated Basket Maker I of west-central Colorado. Dolores Cave revealed a continuous occupation from Basket Maker II times to early modern times. None of these caves were alike, although all revealed some artifact types in common. Taken as a whole they indicate that the cultures were not pure, but that they were closely interrelated and with influences upon each other.

Cottonwood Cave, on the basis of the preliminary work, is apparently with Basket Maker and Pueblo occupancy. The artifacts so far recovered indicate this. Both cultures are of a peripheral nature. The artifacts include: sandals, cordage, feather work, stone work, food such as corn, bone, cists, bundles, etc. One of the bundles is of more than ordinary interest as it is well-made, of juniper bark tied with yucca leaf, and about half again the size of a football and of the same general shape. It is apparently filled with shelled corn and corn on the cob. Later in the year it will be x-rayed and opened. It is unlikely that it is merely a food cache; it is an offering.

In the front of the cave, exploratory operations went down to a depth of thirteen feet with hardpan not yet in sight. Charcoal layers continued for most of this depth. We must go the entire distance to hardpan next year, and over a considerable area, for we cannot pass up the possibility of one or more of the very early cultures being present.

The Pueblo is of early Pueblo I-II age and definitely of the peripheral type. The walls were completely fallen down and of very crude construction. The timber roof has been completely burned out. The floor yielded numerous artifacts, all of imperishable nature. The pottery types were numerous and some of them make possible checking with other areas. The projectile points were also numerous and will give the definite characteristics for this trait. Other artifacts were of bone. No perishable material of any nature was found.

We call this house excavated by us this year *Lone-Tree House* of the *Cottonwood Pueblo*. It shows some similarities to the conditions met with in our work on Tabeguache Pueblo in 1945, but it

also shows some differences. All this ties in with our general idea that the cultures of the area were not homogeneous.

Only preliminary study has thus far been possible. The material will be studied at leisure before final conclusions will be made. However, it is obvious that another link in the chain of evidence that will finally elucidate the eastern part of the Northern Peripheral Area has been obtained. The ultimate aim is, site by site, pattern by pattern, to lay bare the whole history of the area from beginning to end.

EDITH PORADA, Iranian Institute

Grant No. 971 (1947), \$1,200. Study of ancient Near Eastern stamp seals in North American collections.

Stamp seals are small perforated objects with part of the surface engraved in such a manner as to leave an impression in pliable materials like clay. Usually they are made of stone and their shapes vary considerably. More attention is often given to the shape of the stamp than to the design on the sealing surface. This is in contrast to the cylinder seals of southern Mesopotamia where attention is focused exclusively upon the engraving of the sealing surface which takes in the entire circumference of the stone.

The designs of the stamp seals lack the individual qualities so common in cylinder seals; in fact, the fund of designs is rather small and widely separated regions work in very similar repertoires. Consequently, though it may be possible to give a general characterization of the stamp seals of a particular region, classification of a specific piece as of that region is often uncertain.

The first region investigated in the course of the present research was Iran since the pieces collected by Herzfeld in Tepe Giyan and vicinity form one of the major collections of stamp seals included in the *Corpus*.

In Iran stamp seals appear in every settlement so far excavated at a definite stage in the development, when contact between different regions ceased to be more or less accidental and extensive trade developed. Moreover, the first considerable use of metal seems to be contemporary with the appearance of stamp seals.

This stage was reached at a time that roughly corresponds to the Ubaid period of Mesopotamia.¹ From this time onward, stamp seals

¹ McCown, Donald E., The comparative stratigraphy of early Iran, *Studies in Ancient Oriental Civilization*, no. 23; table II, Orient. Inst. Univ. of Chicago, 1942.

occurred in considerable numbers until a period approximately contemporary with the Jamdat Nasr age of Mesopotamia. Then the number of stamp seals dwindled to a few examples. In Susa and Sialk cylinder seals, already well represented earlier, appear to have replaced stamp seals almost completely. This would indicate that these sites of southwestern and central Iran were under strong Mesopotamian influence at that time. On the other hand, Tepe Hissar in northeastern Iran shows stamp seals made of metal with designs that are similar to those of metal seals from Alishar and Anatolia, but also to seals from Anau in Turkestan. These metal seals are associated at Hissar with a grey pottery and a highly developed metal industry, the source of which is as yet unknown.

ROBERT M. TATUM, U. S. Naval Academy

Grant No. 928 (1947), \$100. Distribution of petroglyphs in the United States.

A study has been made of the distribution of the numerous petroglyph sites in the United States. By means of personal visits, survey letters, and consultation of former works, more than one thousand sites have been recorded. The designs present at these sites have been copied by photography, molds or sketching. Note has been made of the state of the site as regards other remains as dwellings, burials, etc.

The designs discovered were recorded on survey lists of typical designs for later reference. The importance of these designs was proved by a statistical study of the petroglyphs of California. This study showed the association of petroglyph designs and geographical areas as well as the correlation of designs and cultural areas. Likewise a statistical study was made of the sites in the state of Oregon. By use of such a study and with the aid of other data on the archaeology of California it was possible to develop a chronological series of events in that state and to give to the petroglyph areas approximate dates.

In other sections of the United States the results of the study showed the presence of other petroglyph areas. Some of these could be recognized by the color of paint used to make the design, the style, the subject or cases of superimposition. In each area the less important items of noting local stories concerning the sites, the events depicted, or any general information was recorded.

As the majority of the sites are to be found in the western half of the United States, where archæology has given to us means of dating sites, the age and migration problem was approached from the west.

The material already available in California and other parts of the southwest gave a firm basis for developing the age series. By use of known dates, cases of superimposition, style techniques, etc., it was possible to build up a whole age sequence for the United States. This study has shown that the petroglyphs first made their appearance in the southwest about the time of the Folsom man. This group of designs differed little from designs found in Siberia today. Later new groups came to the Basin Region of Nevada and made simple curvilinear designs. This style developed and extended until about A.D. 0. Near the beginning of the Basketmaker period a complex style developed in the San Juan Region and was related to the Basketmakers. This style extended into surrounding states and went through several periods until A.D. 700. About A.D. 900 a new style rose up in California and Nevada. The next change occurred about A.D. 1100 with the Pueblos in New Mexico making new figures and using new styles. Of course many of these eras and areas overlapped and only by use of mathematical means were some areas defined.

By following design changes, typical figures, etc., one can trace an extension of petroglyphs northward to Wyoming and east to Minnesota. From Minnesota the trail leads southward to Missouri and eastward to the New England coast. Along this route we find areas of local development. This migration of design is not too ancient and corresponds with the theory of the Delaware migration. In the east we note local styles as well as certain sites which could be only the results of Viking voyages.

The study has shown the use of petroglyphs in determining the limits of cultural areas and their use in dating sites without the need for extended excavation. Throughout the first phases of the study the subject was approached from a purely mathematical point of view, and the results thus obtained agreed with those found using a variety of accepted anthropological tests.

TATUM, ROBERT M. 1947. The importance of petroglyphs in Tennessee. *Tennessee Archæologist* 3(2): 28-29.

—1947. New horizons in archæology. *Science* 106(2744): 97-98.

HELEN C. PALMATARY, University Museum,
University of Pennsylvania

Grants No. 30—Johnson Fund (1941), \$680, and No. 723 (1943), \$700.
Study of the archæology of Marajó Island, Brazil.

This study has been based upon examination of Marajó collections at the University Museum, University of Pennsylvania; the Museum of the American Indian, Heye Foundation, and the American Museum of Natural History, New York; the Brooklyn Museum; the Peabody Museum of American Archæology and Ethnology, Harvard University; the National Museum, Washington; the Museu Goeldi, Belém, Brazil. The private collection of the late Carlos de Oliveira, formerly Director of Museu Goeldi, also was studied. In addition, photographs and descriptive material from the Museu Nacional, Rio de Janeiro; the Museo Etnografico Luigi Pigorini, Rome; and the private collection of Dr. Antonio Mordini of Barga, Italy, were reviewed.

In addition, there are at least two other important Brazilian collections, a small one at the University of Michigan and collections of varying size and importance in several European museums. The amount of archæological material recovered from Marajó has been very considerable.

The art of a people can never be entirely appreciated without some conception of the physical conditions under which it was produced. This seemed especially true of Marajó Island with its extensive permanent swamps and seasonal inundation. Dr. William C. Farabee, who represented the University Museum in South America between 1913 and 1916, published one paper which is somewhat descriptive of the topography and seasonal changes of the island, and one or two naturalists have made interesting contributions, but there is no comprehensive study of the geography and climate of Marajó in English. The writer therefore turned to Brazilian sources and based the geographical introduction to this report on the publications of D. S. Ferreira Penna, Delgado de Carvalho, and Paul Le Cointe. Some reference to the fauna of the island seemed desirable since, in Amazonia, decorative motifs are frequently of faunal inspiration. This section of the introduction has been based upon the writings of Emilio A. Goeldi. Another important source of information was Dr. Inocencio Bentes, the engineer in charge of the waterways on Marajó and around the

Port of Pará. He answered many specific questions concerning which the writer could find no published information, and sent copies of rare reports on early hydrographical surveys of the island.

A problem which naturally presented itself was, "What tribe or tribes were on the island when the Portuguese first arrived in this area?" The best answer to this question seemed to be in a letter of the Jesuit missionary, Antônio Vieira, written in 1654. In this he stated that there were twenty-nine tribes on Marajó speaking languages "as different as Spanish and German." Another Jesuit, João Felipe Betendorf, who was in the area somewhat later, wrote that there were seven tribes on the island, that they could not understand each other, and that they frequently warred among themselves. With the exception of the Aruans, which some authorities believe to have been Arawaks, the ancient inhabitants of the island, in both early and modern literature, are usually referred to as "*Nheengaíbas*," a Tupí word which has been variously interpreted. Several Brazilian writers have commented on the statements of Vieira and Betendorf, among them being E. A. Goeldi, D. S. F. Penna, Arthur Vianna, Theodoro Sampaio. An important Portuguese authority is J. Lúcio de Azevedo, whose book, *Os Jesuitas no Grão-Pará, suas Missões e a Colonização*, is a real contribution to early history of this area. Most of the research for the geographical and historical sections of this report was done in the Lima Library of the Catholic University, Washington, which contains much rare source material concerned with early Brazilian history.

The third section of this study is a chronological record of excavations on Marajó made up largely of direct quotations from the published reports of those who have dug there, or from other published reports, or from unpublished field notes.

Archæological research on Marajó dates back to 1870 and was initiated by D. S. F. Penna who brought to the attention of the American geologist, C. F. Hartt, at that time in Brazil, the probability of finding important Indian remains on the island. Considerable work was done between 1870 and 1879, reports of which may be found in Tomos II and VI of the *Archivos do Museu Nacional*, Rio de Janeiro. In 1882 Ladislau Netto organized an expedition to Marajó which brought back much of the present collection in the *Museu Nacional*. His report, also, is in Tomo VI of the series just referred to. J. B. Steere of the University of Mich-

igan visited the island in 1871 and again in 1879. He has left a short report of his work there. Less interested scientifically but richly rewarded archæologically was Algot Lange who, in 1913, excavated the famous peninsula of Pacoval in Lago Ararí. This was followed by the work of Dr. W. C. Farabee of the University Museum, who dug several sites on Marajó in 1914 and 1915. For record of his work, the writer has had access to his field notes and to his correspondence with the University Museum. In 1925 the late Dr. Carlos de Oliveira, formerly Director of the Museu Goeldi, excavated Severino, a site from which some of the finest Marajó pottery has been recovered. In 1926 Dr. Antonio Mordini of Barga, Italy, excavated at Pacoval and Teso dos Gentios; in 1928 he worked at Panellas. He kindly placed his field notes at the writer's disposal. About 1930 D. Heloisa Alberto Torres, Director of the Museu Nacional, excavated "five hitherto unknown camp sites." The journalist-explorer, Desmond Holdridge, headed an expedition for the Brooklyn Museum, 1931-1932, and brought back a fine collection. The only records of this expedition are one very short article and a popular book.

A striking feature of Marajó archæology is the multiplicity of wares which have been found on the island. The fourth and major division of the report is the Stylistic Analysis, in which the writer has attempted to classify and describe Marajó wares. This section includes a chart with frequency indices. The major divisions of this classification are: Unpainted, Smoked, Uncised Monochrome, Painted and Engraved, Engraved Transitional, Champ Levé, Dichrome, and Polychrome. These major categories have been further subdivided into individual wares. This classification is not quite in its final form but the number of distinct wares at present listed is about sixty.

No careful stratigraphical studies have ever been made on Marajó, so we have no archæological record concerning which may have been the oldest ware. However, on the basis of the collections themselves, it would seem that, of the painted wares, probably dichrome and polychrome are the oldest, the reason being that both exist independently and also together on two surfaces of the same vessel as well as in combination with several of the engraved wares and with champ levé.

An effort has been made also to trace possible stylistic relations between Marajó pottery and that of other areas. This study of cor-

relations is not yet complete, but it would seem that while Marajó pottery shows resemblances in form to certain Venezuelan and Greater Antillean types, the strongest correlation so far as form-types are concerned is with northwestern Florida and the Lower Mississippi Valley. In painted decoration, Marajó pottery shows considerable similarity to designs reported from Coelê. Its relation to Santarém is displayed largely by the use of hollow rims, superimposed forms, and the crescent-base figurine.

Correlations have been based largely upon published material but two important unpublished collections were studied—that of the University of Arkansas at Fayetteville and that of Mrs. Henry H. Simpson of High Springs in northwestern Florida. In the Simpson collection there were four pieces which showed strong correlation with Marajoan forms, and one of these was of special significance. In the Arkansas collection resemblance to Marajó was less striking; nevertheless, it contained several pieces which displayed Amazonian characteristics, some Marajoan, some Tapajoan.

An invaluable Brazilian contribution to this research has been two excellent maps—a general map of the island giving considerable geographical detail, prepared especially for this study at the Comissão Brasileira Demarcadora de Limites, Primeira Divisão, under the direction of Comandante Braz de Aguiar, and a site map prepared personally by Dr. Inocencio Bentes who probably knows the island better than anyone else. His map discloses the fact that some of the sites formerly important have been completely obliterated; on the other hand he records sites concerning which nothing heretofore has been published. These maps will be of great aid to future scientific expeditions on Marajó. The writer is deeply appreciative of the gift of them.

Research on Marajó will not tell the whole story of ancient civilizations at the mouth of the Amazon. There are several islands, both large and small, between Marajó and the mainland to the north, the archæology of which appears to be different both from each other and from Marajó as well. What is known of the north-eastern mainland also seems quite unlike that of Marajó. This whole area is greatly in need of careful investigation.

MUSIC

SAMUEL P. BAYARD, Pennsylvania State College

Grant No. 885 (1946), \$300. Collection of folk songs and music in Pennsylvania.

Four field trips were made, in which most of the time was spent in Fayette County. One brief excursion into Washington County was without result. The final expedition carried the collector into neighborhoods of Somerset and Westmoreland Counties, where there seems to be a promising field for future investigation. The bulk of the material collected in 1946 comes from northern and central Fayette County.

Ninety-two items were gathered, classifiable as follows: song items (text with tune; or tune; or text), 29; fifers' tunes, 17; fiddlers' tunes, 46. Also, as usual, various items of general information were set down: reminiscences and stories about earlier folk performers, fife and drum bands, and local customs of playing and singing; notes on the transmission and use of the collected material; and other traditions about it in the different neighborhoods.

When the collector was making application for this grant, he laid stress on the rapid disappearance of the folk art of our earlier settlers. The experiences of the summer of 1946 made him feel that his remarks were not exaggerated, at least in so far as the southwestern regions of Pennsylvania were concerned. Those who still recall and perform the folk song and music in that area are noticeably fewer and more widely scattered, and less copious in their knowledge and repertoires than they were found to be even in 1943. As usual, some informants previously visited had passed away; while others were incapacitated by ill health or advancing age from helping the collector as they had done in the past.

Another factor which to some extent hindered the work of collecting was the full-time employment of most potential informants. The older, "retired" generation, completely at leisure, has largely disappeared, and those who know the traditional song-and-music material are naturally busy a great deal of the time at their daily work. The immediate effect of this condition on the collector's schedule was that a great deal more time had to be spent in preliminary interviews and negotiations for appointments, and in waiting for informants to be available. Thus, the collector found himself unable to do as much as he had wished in the time available for expeditions. Generous allowances of time must always be made for interviews; and it is not now always possible to stay overnight at informants' homes, or to find lodgings in the countryside, or in small villages, as it was fifteen to eighteen years ago in rural areas of southwestern Pennsylvania. It is apparent that

any future work of this kind must be done with an automobile, to insure quick passage from one district to another and avoid the waste of precious time involved in waiting and travelling on public conveyances.

On the other hand, the results of inquiries made during the summer of 1946 were by no means all of a discouraging nature. The material gathered was in every way representative, and seemed to belong to the genuine local repertory of the region from earlier days. It established even more of a community of repertory and general tradition in southwestern Pennsylvania than had been imagined previously, and simply added to the evidence that the folk song and music traditions of the region were essentially one with those of the entire South. Some exceptions to this general statement can be made, however—the most striking being the existence in Pennsylvania of a large, varied, and unusual stock of fifers' melodies such as has been found nowhere else so far.

Likewise, the inquiries in 1946 elicited information that seems to show still greater opportunities for further collection, despite the gradual disappearance of this sort of popular art. More fifers were discovered in Allegheny County north of Pittsburgh; what may possibly be the last active western Pennsylvania martial band (folk drum and fife ensemble) is still playing in northern Butler County; another group of folk singers was encountered in the northern Fayette County mountains just at the close of the last 1946 field trip; fiddlers, and an occasional reputed singer, have been located east of Williamsport, west of Mifflintown, and about Bellefonte; and inquiries from people acquainted with such folk material in Westmoreland and Jefferson Counties indicate that much can still be done in those areas. The collector is conscious that only a small portion of Fayette County, which has already yielded a great deal of highly informative material, has really been explored. Thus far, only two counties in Pennsylvania have had any real attempts at careful inquiry and methodical collection made in them: Fayette and Greene.

In brief, the student of oral English folk-culture in Pennsylvania is still in a condition of perpetual discovery. Recent independent collecting work done by Mr. J. A. Evanson in Pittsburgh has revealed the existence there of a distinctive Gaelic Irish tradition hitherto unsuspected. The inference of such discoveries is

that there is much to recover and to learn yet before we can actually be said to know anything about folk traditions over most of Pennsylvania.

HISTORY OF ART

FISKE KIMBALL, Philadelphia Museum of Art

Grant No. 946 (1947), \$1,000. Creative figures in French architecture under Louis XIV.

Two months of search at the Archives Nationales, the Cabinet des Estampes, the Bibliothèque de l'Institut, the Bibliothèque Mazarine, the Bibliothèque des Arts-décoratifs, and the Institut d'Art et d'Archéologie added disappointingly little in prime new documents to those already published and discussed in the author's book *The Creation of the Rococo* (1943) and other previous publications.

The fortunate coincidence of a small excavation undertaken for a practical purpose by the architects in charge of the Palace of Versailles—at the one point crucial for the author's investigation there, and prior to covering that area permanently with ferro-concrete—permitted verification of the conclusions of this study of the initial projects of Louis Leveau for the Château Neuf at Versailles, 1668-1669.

KIMBALL, FISKE. The genesis of the Château Neuf at Versailles, 1668-1669. *Gazette des Beaux-Arts*. (In press.)

CHARLES DE TOLNAY, Institute for Advanced Study

Grant No. 929 (1947), \$800. Michelangelo, Volume IV. This volume will contain the history and reconstruction of the different versions of the Tomb of Julius II, the history and interpretation of the Last Judgment and of the late sculptures of Michelangelo.

A trip was made to France and Italy with the purpose of studying the late works of Michelangelo. Originally a trip to London was also planned, but this had to be abandoned since the collection of drawings in the British Museum is not yet accessible for study purposes. In France and Italy, work has been done in three directions:

1. In the great public libraries of Paris, Rome, and Florence, European literature on Michelangelo published from 1939 to the

present has been systematically investigated. This literature is for the most part not yet available in the libraries of this country because many of the books published during the war were already out of print at the end of the war. Also the extremely rare two versions of the *editio princeps* of Condivi, *Vita di Michelangelo*, 1553, which is lacking in the libraries of this country, have been studied in Paris, Bibliothèque Nationale, Rome, Biblioteca Vittorio Emanuele, Vatican Library, and Florence, Biblioteca Nazionale.

2. Work on the original documents has been done in the Buonarroti archives of Florence and in the Vatican. The hitherto unpublished letters written to Michelangelo, of which copies were made in 1935-37, have been again collated with the originals. They will be published in the book in preparation, *Michelangelo's Last Period*, work upon which will probably be finished by the end of 1948. The Codex Vaticanus 3211 has been investigated with the aim of establishing a chronological sequence among the autographs. Finally, the original drawings of Michelangelo and his school have been examined in the Louvre in Paris and in the Uffizi in Florence.

3. The original sculptures and frescoes of Michelangelo's late period have been thoroughly investigated, and in the process, observations made at an earlier date by me have been confirmed. The partly new observations and results will be utilized in the forthcoming volume.

THOMAS WHITEMORE, Byzantine Institute

Grants No. 824 (1945), \$2,000, and No. 969 (1947), \$1,000. The conservation and the uncovering of Mosaics in the churches of: S. Saviour in the Chora, S.S. Sergius and Bacchus, S. Mary Pammakarios—Istanbul.

The Church of S. Saviour in the Chora (probably meaning in the fields) in Constantinople, stood, before Theodosius II built the walls of 413, outside the city.

Already ancient, it was restored by Justinian the Great in the sixth century and subsequently preserved in successive conservations until finally it was renovated and given its present mosaic decoration by the wealthy Theodore Metochites in the fourteenth century.

Kathriyé Çami is the name by which this building has been known since it ceased to be a Christian Church. "Kahriyé" is probably a phonetic rendering of the Greek word *χωρα* as it sounded

to the Turkish ear. Although the renown of these hitherto imperfectly uncovered and roughly conserved mosaics in this building, has designated it "The Mosaic Mosque," it is only now that the mosaics are to be seen in something of their original brilliance.

The Turkish Government is aware of the treasure Kahriyé Çami contains and, looking forward to the celebration of the Quincentenary of the conquest of the City, has declared the building a National Museum. In collaboration with the Byzantine Institute the Government has appropriated a small sum of money to be used in structural repairs. To this conservation the Institute has brought the expert advice of its consulting engineer, Mr. Vinton Tompkins. Three scaffoldings have been erected by the Institute, one filling the north bay of the outer narthex, one in the inner narthex, and one in the interior of the church. On the scaffolding in the outer narthex two men have given full time, and four men part time, in a day of eight hours of work from July to November, 1947. On the north wall of the north bay of the outer narthex is represented in mosaics the Dream of Joseph, on the east wall of the same bay the Registration of Joseph and Mary before Cyrenius. This latter scene appears to be unique in Eastern iconography. On the west wall of the same bay the Boy Jesus is represented going up to Jerusalem for His first Passover.

It is only on these scaffoldings within touch of the mosaics that we have been able to examine them and to ascertain the appalling condition in which they survive. Deep fissures in the walls have been filled and the panels consolidated. Large areas which through dampness and infiltration of water had become detached from the walls, and where many cubes were hanging by mere threads of plaster, have been reestablished. To have cleaned these mosaics before conserving them would have resulted in brushing them from the walls. The work of conservation of the small tessellae in which these late Byzantine mosaic pictures were wrought is less like handling stone and glass than like repairing moth-eaten textiles. There is no doubt that with skill and patience these mosaics set between 1300 and 1310 can be saved for generations of the future.

6. REPORT OF THE COMMITTEE ON FINANCE

According to the Laws of the Society, the Committee on Finance consists of the President and the Treasurer, *ex-officio*, and not fewer than five other members who shall be nominated by the President and elected by the Society at the General Meeting in April.

Chapter V, Articles 3 and 4 of the Laws read :

“The Committee on Finance shall have the general superintendence of the financial concerns of the Society. It shall have the custody and control of all the securities and investments of the Society, both real and personal, with full power and authority to buy and to sell, and to invest and reinvest the same; including the power to purchase and to sell real estate and to make leases thereof, to satisfy mortgages and extinguish ground rents, and to direct the placing of all such insurances as it may deem necessary; as well as to borrow on the credit of the assets of the Society, to create mortgages thereon, and to make such improvements, repairs and alterations to real estate as it may deem necessary. It shall have power to authorize the proper Officers of the Society to execute the necessary papers to effect all purchases, sales and assignments of property, both real and personal; to execute and to satisfy mortgages, to extinguish ground rents and to transfer registered securities; to subscribe to bond-holders' agreements to plans of reorganization involving any securities held by the Society or in which it has an interest, and to do all such acts as are necessary in pursuance of the foregoing powers.

“The Committee on Finance shall always have access to the Treasurer's books, accounts, and vouchers, and shall cause an audit of such accounts to be made at least once a year. It shall require from the Treasurer an annual report of all the operations of the treasury, which it shall present to the Council with an annual statement of estimates of receipts and expenditures. With the approval of the Council it shall determine the fiscal year of the Society and, in case of emergency needs, authorize appropriations over and above the annual budget.”

During the year 1947-1948, the Committee on Finance consists of Marshall S. Morgan, *Chairman*, Oliver E. Buckley, Morris Duane, *Secretary*, Edwin G. Conklin, Edward Hopkinson, Jr., Nicholas Kelley, Charles J. Rhoads, J. Henry Scattergood, and Thomas S. Gates, *President*. Luther P. Eisenhart, *Executive Officer*,

sits with the Committee, and John S. Malick represents the Fidelity-Philadelphia Trust Company, *Treasurer*.

The members of the Committee meet regularly once a month from January to June and from October to December with occasional special meetings.

GENERAL AND SPECIAL FUNDS

There are twenty-four funds of the Society. Only five of these are unrestricted in the uses to which their income may be applied "for promoting useful knowledge"; three specify a primary purpose, after which any balance may be used for general purposes; sixteen are restricted to specific uses, eleven of these being for the purchase of books for the Library. These funds and the manner and purpose of their establishment are listed alphabetically below.

BALCH INTERNATIONAL LAW LIBRARY FUND

Founded by Thomas Willing Balch, Esq., of Philadelphia, October 13, 1911, with an initial gift of securities valued at about \$700, increased by later gifts to about \$1,600, as a memorial to his father for his part in bringing about the submission of the Alabama Claims to the Geneva Tribunal. A part of the income to be used for the purchase of books relating to the law of nations and such other uses, when thought advisable, as may promote the study of that science; a part, not less than one-half, to be added annually to the principal.

BOYÉ LIBRARY FUND

Bequest of \$1,879.21 by Professor Martin Boyé, of Coopersburg, Pa., who died March 5, 1909. By resolution of the Society, December, 1910, the income to be expended in the purchase of books, preferably on chemistry and geology.

BRUSH ENDOWMENT FUND

Gift of \$10,000 by Charles Francis Brush, LL.D., of Cleveland, Ohio, November 24, 1914. Income to be used for the general purposes of the Society.

BUILDING FUND

Created by deed of trust dated June 4, 1900, Girard Trust Company, depository and trustee. All money or property which shall be designated or devoted by any donor, testator or other person, for the acquisition of land or buildings for the Society's

use, shall be forthwith paid over, conveyed, or delivered by the Society to the said depositary, for the acquisition of land and the construction and furnishing of buildings for the use and occupation of the Society. The present value is \$684,966.29.

CARLIER LIBRARY FUND

Bequest of \$5,000 by Auguste Carlier, of Paris, who died March 16, 1890. The income, less 10 per cent which is to be added to the principal, is to be expended for the purchase of books for the Library.

CARNEGIE LIBRARY FUND

Gift of \$100,000 by the Carnegie Corporation in 1931. The income to be used for the maintenance of the Library.

DALAND FUND

Bequest of the residuary estate of Dr. Judson Daland, of Philadelphia, who died August 14, 1937, approximately \$220,000. The income, less 10 per cent which is to be added annually to the principal, to be used by the Society for research in clinical medicine.

FRANKLIN LIBRARY FUND

Established by the Library Committee in May, 1911, from funds derived from the proceeds of the sale in that year of duplicates, formerly the property of Benjamin Franklin, approximately \$3,400. The income to be used for the purchase of books.

GENERAL FUND

This fund has been accumulated from various sources through many years; its income is available for the general purposes of the Society.

JEFFERSON LIBRARY FUND

Established by the Library Committee on January 20, 1905, from the proceeds of royalties from the publication of manuscripts acquired by the Society through President Thomas Jefferson, approximately \$1,700. Income to be used for the purchase of books.

JOHNSON FUND

Established in 1937 when Mr. Eldridge Reeves Johnson removed the restriction on his gift of \$500,000 and changed it

to General Endowment until 1957, unless prior thereto Mr. Johnson directs that it be used for some other purpose of the Society. After 1957 it is to become an unrestricted gift. All income to be used for the general purposes of the Society.

LEWIS FUND

Gift of \$10,000 made by Mrs. John F. Lewis in 1935 in memory of her husband; the income to be used each year as an award to the American citizen who shall announce at any general or special meeting of the Society, and publish among its papers, some truth which the Council of the Society shall deem worthy of the award. In any year income not so awarded to be added to principal.

MAGELLANIC FUND

Gift of 200 guineas by John Hyacinth de Magellan, of London, in 1786, for a gold medal to be annually awarded under prescribed terms, to the author of the best discovery or most useful invention relating to navigation, astronomy, or natural philosophy (mere natural history only excepted). Any surplus of interest remaining to be used for such purposes as may be authorized under the Society's Charter and Laws. By resolution of the Society, December, 1899, the unexpended annual income, less 10 per cent which is to be added to the principal, may be used for the purchase of books relating to those departments of science in which the premium is annually offered.

MICHAUX FUND

Bequest of 92,600 francs by François André Michaux, who died at Vaureal, France, October 23, 1855; for the extension and progress of agriculture, and more especially of silviculture, in the United States. By resolution of the Society, March, 1899, the income, less 10 per cent reserved for investment, to be used for the purchase of books on forestry, etc.; since 1941 the Committee on Research has been charged with the disposition of the income.

NORRIS LIBRARY FUND

Established by the Library Committee in May, 1911, from the proceeds of the sale in that year of duplicate pamphlets, presented to the Society in 1815 by Joseph Parker Norris, Esq.,

of Philadelphia, approximately \$2,100. Income to be used for the purchase of books.

PENROSE FUND

Bequest of one-half of the residuary estate of Dr. Richard A. F. Penrose, Jr., of Philadelphia, who died July 31, 1931, approximately \$3,900,000; by the terms of the bequest this gift to be considered an endowment fund, the income of which only is to be used and the capital to be properly invested.

PHILLIPS LIBRARY FUND

Bequest of his residuary estate, approximately \$3,410 (December, 1895), by Henry Phillips, Jr., Esq., of Philadelphia, who died June 6, 1895, to which were later added two bequests to him, confirmed and audited October 5, 1903, of \$7,547.54 from the estate of his aunt, Emily Phillips, and of \$42,315.80, being an interest in the residuary estate of his uncle, Henry M. Phillips. Income to be used for the purchase of books on archæology and philology in accordance with the terms of the bequest.

PHILLIPS PRIZE ESSAY FUND

The gift on October 5, 1888, of \$5,000 by Miss Emily Phillips, of Philadelphia, in memory of her brother Henry M. Phillips. Income to be used in the awarding of a prize for the best essay of real merit on the science and philosophy of jurisprudence.

PROUD LIBRARY FUND

Established by the Library Committee in May, 1911, from the proceeds of the sale in that year of duplicate pamphlets presented in 1812 by Robert Proud, Esq., of Philadelphia, \$2,500. Income to be used for the purchase of books.

SEYBERT LIBRARY FUND

Bequest of \$2,000 by Henry Seybert, Esq., of Philadelphia, who died March 3, 1883. By resolution of the Society, November, 1909, the income to be expended for the purchase of books.

TILGHMAN LIBRARY FUND

Bequest of \$200 by Chief Justice William Tilghman, of Philadelphia, who died April 30, 1827. Income to be expended for the purchase of books.

UNIVERSITY EXTENSION—JAYNE FUND

Established December 17, 1946 by order of the Court of Common Pleas of Philadelphia dissolving the Corporation of the American Society for the Extension of University Teaching and awarding the remaining property of the Corporation, including that received from the Jayne Memorial Fund, and from any other source, to the American Philosophical Society, to be used for the promotion of university teaching, including, *inter alia*, arranging for lectures, publications, and research in the fields of the sciences, literature, and the arts. This fund by action of the Society is held as a memorial to Henry LaBarre Jayne, an officer and supporter of the American Society for the Extension of University Teaching, and a former Treasurer of the American Philosophical Society. The fund thus established consists of securities and cash appraised at about \$34,000.

WHITFIELD FUND

Bequest of the residuary estate of James Edward Whitfield of Philadelphia, who died November 4, 1930; approximately \$42,000. This fund was left "absolutely and in fee." Ten per cent of the income will be added to principal annually and the balance applied to general purposes of the Society.

WOOD MEMORIAL FUND

Bequest of the residuary estate of Walter Wood, of Philadelphia, who died April 20, 1934, approximately \$150,000, in memory of his uncle, George B. Wood, his cousin, Horatio G. Wood, and his two brothers, Richard and Stuart Wood, all of whom were members of the American Philosophical Society; to be used by the Society first for the construction of a building that shall be adequate for the needs of the Society and if there be any surplus, then the same to be applied to such useful purpose or purposes as the Counsel (*sic*) and Officers of said Society may determine.

ENDOWMENT FUNDS OF THE SOCIETY IN ORDER OF ESTABLISHMENT

Date	Name and Purpose	Book Value	
		Original	Dec. 31, 1947
1. 1786	Magellanic Medal and Premium Discovery or most useful in- vention relating to navigation, astronomy, or natural phil- osophy	200 guineas	\$5,779.07*
2. 1827	Tilghman Fund for books for the Library	\$200.00	2,091.71
3. 1855	Michaux Fund for promotion of agriculture and silviculture..	92,600 francs	55,000.56*
4. 1883	Seybert Fund, assigned to Li- brary, 1909	\$2,000.00	3,931.14
5. 1888	Phillips Fund for Prize Essay on jurisprudence	5,000.00	14,234.17
6. 1890	Carlier Fund for books for the Library	5,000.00	14,518.18*
7. 1895-1903	Phillips Fund for books on archæology and philology for the Library	53,273.00	95,179.07
8. 1900	Building Fund for Land and Buildings	Gradual accumulations	684,966.29
9. 1900	General Fund	Gradual accumulations	1,330,691.01
10. 1905	Jefferson Fund for books for the Library	1,700.00	3,846.43
11. 1909	Boyé Fund, assigned to Library, 1910	1,880.00	3,463.80
12. 1911	Proud Fund for books for the Li- brary	2,500.00	5,864.78
13. 1911	Norris Fund for books for the Library	2,100.00	4,787.47
14. 1911	Franklin Fund for books for the Library	3,400.00	10,213.97
15. 1911	Balch International Law Library Fund	1,600.00	5,211.40†
Amount forwarded		\$78,653.00	\$2,239,779.05

* 10% of income is added to Principal annually.

† 50% of income is added to Principal annually.

Date	Name and Purpose	Book Value	
		Original	Dec. 31, 1947
	Brought forward	\$78,653.00	\$2,239,779.05
16. 1914	Brush Endowment Fund, for general purposes	10,000.00	11,526.01
17. 1931	Carnegie Library Fund for main- tenance of Library	100,000.00	87,356.68
18. 1931	Penrose Fund, unrestricted	3,900,000.00	4,438,633.04
19. 1934	Wood Fund primarily for a build- ing	ca. 150,000.00	802,355.34
20. 1935	Lewis Prize Fund	10,000.00	11,784.96
21. 1937	Johnson Fund for general purposes.	500,000.00	601,513.63
22. 1937	Daland Fund for research in clinical medicine	220,000.00	242,677.43*
23. 1942	Whitfield Fund for general purposes.	42,000.00	46,837.35*
24. 1946	University Extension—Jayne Fund.	33,600.02	33,716.73
Totals		\$5,044,253.02	\$8,516,180.22
		200 guineas	
		92,600 francs	

ASSOCIATED FUND

Created as of December 31, 1939, in accordance with a resolution adopted by the Committee on Finance, December 5, 1939, with the approval of Legal Counsel. All assets held in the Balch International Law Library, Boyé Library, Brush Endowment, Carlier Library, Franklin Library, Jefferson Library, Lewis, Magellanic, Michaux, Norris Library, Phillips Library, Proud Library, Seybert Library, Tilghman Library, University Extension—Jayne, and Whitfield Funds, have been transferred to the Associated Fund at their market value, and each contributing fund has been assigned a proportionate interest in the Associated Fund based on the value of assets contributed.

The Auditor's Report made by our certified public accountants, Linvill & Parry, on file in the Society's office, contains schedules setting forth the receipts and disbursements of income and principal in the foregoing funds. It also includes a statement setting forth the book value of these funds as of December 31, 1947.

In accordance with action taken by the Council and approved by the Society at its meeting in November 1947, the books were closed on December 31, 1947 by carrying forward commitments

made but not due in the Penrose, Johnson, and Daland Funds, Books and Manuscripts, Meetings, and also Publication Expenses. In the Publication Reserve Fund balances were carried forward and Sales of Publications were added to the balance at the end of the year.

In the three Research Funds, all balances of income in excess of commitments at the end of the year were added to the principal of the Funds but subject to withdrawal by the Council.

In the Miscellaneous Small Trusts, unexpended balances of income to the extent of 10 per cent of the gross income or the percentage called for by the respective trust instruments were added to principal and the remaining unexpended income was carried forward for future expenditure, except in the Brush Endowment, Carnegie Library and Whitfield Funds. In these funds, after transferring 10 per cent to principal the balance of income was transferred to the General Fund where the money is available for disposition by the Council.

The income in the Wood Fund Personality and the Wood Fund Real Estate as shown on Schedules IV and V of the Auditor's Report was added to the principal of the Wood Fund Personality with the understanding it may subsequently be withdrawn.

Income from the Building Fund, of which the Girard Trust Company is Trustee, as set forth in Schedules VIII and IX of the Auditor's Report amounting to \$22,426.60, was added to principal of this Fund in accordance with the trust agreement establishing the Fund.

All other income and all other expenses are consolidated in the General Fund (see Schedule I) so that that fund sets forth the operating income and disbursements of the Society. During the past year receipts from the General Fund were:

Balance 12/31/46		\$66,118.58
Transferred to Principal for investment		52,000.00
Balance 1/1/47		\$14,118.58
Income (Consolidated)		273,663.36
		<u>\$287,781.94</u>
Disbursements (Consolidated)	\$228,015.46	
Transferred to Principal for investment	50,000.00	278,015.46
Balance 12/31/47		<u><u>\$9,766.48</u></u>

As a result of the foregoing closing entries a total of \$112,105.16 plus \$50,000.00 excess income and budget balances or \$162,105.16 was added either temporarily or permanently to the principal accounts of the Society.

In considering the General Fund, the principal of which now has a book value of \$1,330,691.01, it is to be noted that this includes the Reserve Fund for Post-War Expenditures of \$164,033.23 and certain similar sums as set forth in Schedule VII of the Auditor's Report. When these are expended, the General Fund will be reduced accordingly.

By agreement dated January 14, 1948, Building Fund, of which the Girard Trust Company is trustee, was terminated in accordance with action taken by the Society and a new agreement entered into. This was done to enable the income of the Trust to be used very broadly for the general purposes of the Society or to be accumulated, but the principal is to be used only for the purposes set forth in the former Trust.

The total book value of all the funds of the Society, as of December 31, 1947, amounted to \$8,516,180.22 as compared with \$8,277,868.07 on December 31, 1946. The market value and the distribution of investments as of March 1, 1948, together with the current yield, are all set forth on page 224. The budget for the ensuing year follows.

Respectfully submitted

M. S. MORGAN

Chairman, Committee on Finance

BUDGET FOR 1948

ESTIMATED EXPENSES

Salaries	\$ 34,000.00	
Executive Office Expenses	6,000.00	
Telephone	800.00	
Insurance	2,000.00	
Committee on Publications:		
Publication Expenses	30,000.00	
Committee on Library:		
Books and Manuscripts	25,000.00	
Library Administration	3,000.00	
Rental for Housing of Library	8,700.00	
Treasurer's Expense	12,500.00	
Hall Fund	5,000.00	
Committee on Research:		
Penrose Fund	75,000.00	
Johnson Fund	22,000.00	
Daland Fund	8,500.00	
Meetings	13,000.00	
Pensions	1,800.00	
Miscellaneous	10,000.00	
		\$257,300.00

Balances carried forward from 1947:

Commitments

Books and Manuscripts	\$ 5,500.00	
Library Administration	254.99	
Meetings	2,000.00	
Publication Expenses	9,200.00	
Research Fund (Penrose)	32,696.37	
Research Fund (Johnson)	3,200.00	
Reserve Fund for Post War Expenditures	39,496.61	\$ 92,347.97

Uncommitted

Publication Reserve	\$ 37,561.74	
Reserve Fund for Post War Expenditures	124,536.62	\$162,098.36

ESTIMATED INCOME

Funds

General	\$ 53,809.06
Charles Francis Brush Endowment	500.78
Carnegie Library	2,000.00
Judson Daland	9,857.00
Johnson Endowment	20,817.00
Richard A. F. Penrose, Jr. Endowment	175,720.50
Whitfield	2,034.97

Income Applicable to Budget \$264,739.31

Funds for Special Purposes¹

Thomas Balch International Law... \$	221.89
Martin Boyé	150.48
Auguste Carlier	630.77
Benjamin Franklin	443.76
Thomas Jefferson	167.12
John F. Lewis Prize	493.55
Magellanic	251.09
François André Michaux	2,389.63
Joseph Parker Norris	208.00
Henry Phillips, Jr.	4,129.51
Henry M. Phillips Prize Essay	592.00
Robert Proud	254.81
Henry Seybert	170.80
William Tilghman	90.88
University Extension—Jayne	1,246.46
Wood Memorial	34,618.00

Funds for Special Purposes \$ 46,058.75

Total Estimated Annual Income \$310,798.06

¹ See Schedule VIII of the Auditor's Report for Building Fund.

DISTRIBUTION OF INVESTMENTS AND MARKET VALUES AS OF MARCH 1, 1948

	Bonds		Guaranteed and Preferred Stocks		Common Stocks		Total	
	Cash Value	%	Cash Value	%	Cash Value	%	Cash Value	%
Uninvested Cash	\$ —	—%	\$ —	—%	\$ —	—%	\$ 106,275.67	1.3%
U. S. Government ...	2,517,603.75	30.1	—	—	—	—	2,517,603.75	30.1
Railroad	710,143.75	8.5	70,933.50	0.8	83,350.00	1.0	864,427.25	10.3
Public Utility	195,675.00	2.3	404,250.00	4.8	833,747.50	10.0	1,433,672.50	17.1
Industrial and Miscellaneous	192,527.50	2.3	501,250.00	6.0	2,154,330.50	25.8	2,848,108.00	34.1
Bank and Insurance Company	—	—	—	—	594,403.50	7.1	594,403.50	7.1
	<u>\$3,615,950.00</u>	<u>43.2%</u>	<u>\$976,433.50</u>	<u>11.6%</u>	<u>\$3,665,831.50</u>	<u>43.9%</u>	<u>\$8,364,490.67</u>	<u>100.0%</u>
Annual Cash Income	\$104,759.50		\$47,287.50		\$203,331.10		\$355,378.10	
Current Yield	2.90%		4.84%		5.55%		4.31%	

VII

AWARDS OF PRIZES

MAGELLANIC FUND, established in 1786 by the gift of 200 guineas by John Hyacinth de Magellan, of London, for a gold medal to be annually awarded under prescribed terms, to the author of the best discovery or most useful invention relating to navigation, astronomy, or natural philosophy (mere natural history only excepted). Any surplus of interest remaining to be used for such purposes as may be authorized under the Society's Charter and Laws.

Awards of the Magellanic Premium

December 1790. To FRANCIS HOPKINSON, Philadelphia, Penna. For the Invention of the Spring Block. "Description of a Spring Block Designed to Assist a Vessel in Sailing" (TRANS. Amer. Philos. Soc. 3, Art. 40, 1793).

December 1792. To ROBERT PATTERSON, Philadelphia, Penna. For the Improvement of Electrical Rods, or Lightning Conductors, by Pointing them with Black-lead. "An Improvement on Metallic Conductors or Lightning-rods in a Letter to Dr. David Rittenhouse from Robert Patterson" (TRANS. Amer. Philos. Soc. 3, Art. 35, 1793).

December 1792. To WILLIAM THORNTON, London, England. For "Cadmus" or a Philosophical Dissertation on the Elements of Written Language. "Cadmus, or a Treatise on the Elements of Written Language, illustrating, by a Philosophical Division of Speech, the power of each Character, thereby mutually fixing the Orthography and Orthoepey. With an Essay on the Mode of Teaching the Surd, or Deaf and Consequently Dumb to Speak" (TRANS. Amer. Philos. Soc. 3, Art. 33, 1793).

December 1794. To NICOLAS COLLIN, Philadelphia, Penna. For a Paper on an Elevator (Nititor [*sic*] in ardua virtus). "Description of a Speedy Elevator by the Inventor" (TRANS. Amer. Philos. Soc. 4, Art. 75, 1799).

November 1804. To CAPTAIN WILLIAM MUGFORD, Salem, Mass. For the Invention of a Temporary Rudder. "An account and description of a Temporary Rudder Invented by Capt. William Mugford of Salem, Mass." (TRANS. Amer. Philos. Soc. 6, Art. 34, 1809).

December 1804. To DR. BEN SMITH BARTON, Philadelphia, Penna. For a Paper on a "Number of the Pernicious Insects of the United States."

- October 1807. To JOHN GARNETT, New Brunswick, N. J. For a Paper on "A New Simple Nautical Chart." "Description and use of a new and simple Nautical Chart, for working the different problems in Navigation" (TRANS. Amer. Philos. Soc. 6, Art. 49, 1809).
- April 1809. To JAMES HUMPHRIES, JR., Philadelphia, Penna. For a Model and Description of Steering Apparatus.
- April 1820. To JOSHUA CHAPMAN, Bristol, Penna. For an Improvement in the Manufacture of Canvas.
- March 1823. To DR. JAS. EWING, Philadelphia, Penna. For the invention of the "Improved Hydrant."
- May 1825. To C. C. BRODIE. For an invention to repair the side of ships, under the surface of the water.
- March 1836. To JAMES P. ESPY, Philadelphia, Penna. Author of the paper signed "Investigator."
- December 1864. To PLINY EARLE CHASE, Philadelphia, Penna. For a paper on "The discovery of Certain new relations between the solar- and lunar- diurnal variations of magnetic force and of barometric pressure" (PROC. Amer. Philos. Soc. 9: 487-495, 1864).
- December 1887. To LEWIS M. HAUPT, Philadelphia, Penna. For a paper on "The Physical Phenomena of Harbor Entrances. Their Causes and Remedies. Defects of Present Methods of Improvement" (PROC. Amer. Philos. Soc. 25: 19-41, 1888).
- April 1922. To PAUL R. HEYL AND LYMAN J. BRIGGS, U. S. Bureau of Standards, Washington, D. C. For the invention of the Earth Inductor Compass. "The Earth Inductor Compass" (PROC. Amer. Philos. Soc. 61: 15-32, 1922).
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PHILLIPS PRIZE ESSAY FUND, established in 1888 by the gift of \$5,000 by Miss Emily Phillips, of Philadelphia, in memory of her brother, Henry M. Phillips. Income to be used in the awarding of a prize for the best essay of real merit on the science and philosophy of jurisprudence.

Awards of the Henry M. Phillips Prize Essay

- May 1895. To GEORGE H. SMITH, Esq., Los Angeles, Calif. \$500. "The Theory of State" (PROC. Amer. Philos. Soc. 34: 181-334, 1895).
- June 1900. To W. H. HASTINGS, Esq., Wilber, Neb. \$2,000. "The Development of Law as Illustrated by the Decisions Relating to the Police Power of the State" (PROC. Amer. Philos. Soc. 39: 359-554, 1900).

- April 1912. To CHARLES H. BURR, Esq., Philadelphia, Penna. \$2,000. "The Treaty-Making Power of the United States and the Methods of its Enforcement as Affecting the Police Powers of the States" (PROC. Amer. Philos. Soc. 51: 271-422, 1912).
- April 1921. To QUINCY WRIGHT, Esq., Minneapolis, Minn. \$2,000. "The Relative Rights, Duties and Responsibilities of the President, of the Senate and the House, and of the Judiciary in Theory and Practice" (PROC. Amer. Philos. Soc. 60: 99-455, 1921).
- October 1935. To LON L. FULLER, Dean of the Law School, Duke University, Durham, N. C. \$1,500 and Diploma. "American Legal Realism" (PROC. Amer. Philos. Soc. 76: 191-235, 1936).
- April 1942. To EDWARD S. CORWIN, Princeton University, Princeton, N. J. \$1,500 and Diploma. *The President: Office and Powers* (New York Univ. Press, 1940-1941), and his articles on "American Constitutional Law."

LEWIS FUND, established in 1935 by the gift of Mrs. John F. Lewis, of Philadelphia, of \$10,000 in memory of her late husband; the income to be used each year as an award to the American citizen who shall announce at any general or special meeting of the Society, and publish among its papers some truth which the Council of the Society shall deem worthy of the award.

Awards of the John F. Lewis Prize

- April 1937. To RALPH E. CLELAND, Goucher College, Baltimore, Md. \$300 and Diploma, for presentation to the Society and publishing in its PROCEEDINGS: "Cyto-taxonomic Studies on Certain *Oenotheras* from California" (Read April 19, 1934,—PROC. Amer. Philos. Soc. 75: 339-429, 1935). "A Cyto-genetic and Taxonomic Attack upon the Phylogeny and Systematics of *Oenothera* (Evening Primrose) with Special Reference to the Sub-genus *Onagra*" (Read April 18, 1935,—PROC. Amer. Philos. Soc. 77: 477-544, 1937).
- April 1938. To ARTHUR J. DEMPSTER, University of Chicago, Chicago, Ill. \$300 and Diploma, for presentation to the Society and publishing in its PROCEEDINGS: "New Methods in Mass Spectroscopy" (Read in part April 20, 1935,—PROC. Amer. Philos. Soc. 75: 755-767, 1935). "Further Experiments on the Mass Analysis of the Chemical Elements" (Read April 25, 1936,—PROC. Amer. Philos. Soc. 76: 491-496, 1936).
- April 1939. To HENRY NORRIS RUSSELL, Princeton University Observatory, Princeton, N. J. \$300 and Diploma, for presentation to the Society and publishing in its PROCEEDINGS: "Stellar Energy" (Read February 17, 1939,—PROC. Amer. Philos. Soc. 81: 295-307, 1939).

- April 1940. To EARLE RADCLIFFE CALEY, Princeton University, Princeton, N. J. \$300 and Diploma, for presentation to the Society and publishing in its MEMOIRS: "The Composition of Ancient Greek Bronze Coins" (Read November 27, 1937,—MEM. Amer. Philos. Soc. **11**: 1-203, 1939).
- April 1941. To GEORGE HOWARD PARKER, Professor Emeritus of Zoology, Harvard University, Cambridge, Mass. \$300 and Diploma, for presentation to the Society and publishing in its PROCEEDINGS: "Integumentary Color Changes of Elasmobranch Fishes especially of *Mustelus*" (Read November 26, 1936,—PROC. Amer. Philos. Soc. **77**: 223-247, 1937). "Melanophore Responses and Blood Supply (Vasomotor Changes)" (Read November 27, 1937,—PROC. Amer. Philos. Soc. **78**: 513-527, 1937). "On the Neurohumors of the Color Changes in Catfishes and on Fats and Oils as Protective Agents for such Substances" (Read April 18, 1940,—PROC. Amer. Philos. Soc. **83**: 379-408, 1940).
- April 1943. To GEORGE GAYLORD SIMPSON, Associate Curator of Vertebrate Paleontology, American Museum of Natural History. \$300 and Diploma, for presentation to the Society and publishing in its PROCEEDINGS: "The Beginnings of Vertebrate Paleontology in North America" (Read February 14, 1942,—PROC. Amer. Philos. Soc. **86**: 130-188, 1942).
- April 1944. To SAMUEL NOAH KRAMER, Associate Curator in the Babylonian Section, University Museum, University of Pennsylvania. \$300 and Diploma, for presentation to the Society and publishing in its PROCEEDINGS and MEMOIRS: "Sumerian Literature: a Preliminary Survey of the Oldest Literature in the World" (Read April 26, 1941,—PROC. Amer. Philos. Soc. **85**: 293-323, 1942). "Sumerian Mythology: a Study of Spiritual and Literary Achievement in the Third Millennium B.C. (MEM. Amer. Philos. Soc. **21**: 1-125, 1944).
- April 1946. To ENRICO FERMI, Professor of Physics, University of Chicago. \$300 and Diploma for his part in the development and application of the concept of chain reactions, and in particular, for presentation to the Society and publishing in its PROCEEDINGS: "The Development of the First Chain Reacting Pile" (Read November 17, 1945,—PROC. Amer. Philos. Soc. **90**: 1-79, 1946).

VIII

GENERAL MEETING LECTURES

THE R. A. F. PENROSE, JR., LECTURES

- 1934. Edwin G. Conklin, "A Generation's Progress in the Study of Evolution"
- 1935. W. F. G. Swann, "Is the Universe Running Down?"
- 1936. Dixon Ryan Fox, "The American Tradition in a New Day"
- 1937. Irving Langmuir, "The Surfaces of Solids and Liquids"
- 1938. S. A. Mitchell, "With an Astronomer on an Eclipse Expedition"
- 1939. Eduard Beneš,* "Politics as Art and Science"
- 1940. Archibald MacLeish, "Writers and Scholars"
- 1941. Edward C. Tolman, "Motivation, Learning, and Adjustment"
- 1942. James R. Angell, "The Problem of Education in a World at War"
- 1943. Carl L. Becker, "What is Still Living in the Political Philosophy of Thomas Jefferson?"
- 1944. Harold Butler, "The International Labor Organization—Lessons of Twenty-Five Years"
- 1946. George Wells Beadle, "The Gene"
- 1947. Francis Biddle, "The Nürnberg Trial"

SPECIAL LECTURES

- November 1936. D'Arcy W. Thompson, "Astronomy in the Classics"
- February 1937. Frederick P. Keppel, "The Responsibility of Endowments in the Promotion of Knowledge"
- November 1937. William Lyon Phelps,* "Truth and Poetry"
- February 1938. Dumas Malone, "The Scholar and the Public"
- Donald P. Bean, "The Riddle of Research"
- November 1938. Alfred J. Lotka, "Contacts of Population Study with Related Branches of Science"
- February 1939. Henry Norris Russell, "Stellar Energy and the Evolution of Atoms"

* Franklin Medal presented.

- November 1939. Carlton J. H. Hayes, "The Novelty of Totalitarianism in the History of Western Civilization"
- February 1940. Laurence M. Gould, "Glaciers of the Antarctic"
- April 1940. Dayton C. Miller, "The Pipes of Pan, Old and New"
- November 1940. Edward S. Corwin,* "Some Aspects of the Presidency"
- February 1941. John A. Fleming, "Geomagnetism: World-Wide and Cosmic Aspects with Especial Reference to Early Research in America"
- April 1941. Hugh S. Taylor,* "Large Molecules Through Atomic Spectacles"
- November 1941. Vilhjalmur Stefansson, "Military Aspects of the Arctic"
- April 1942. Sylvanus Griswold Morley, "The Carnegie Institution's Work in Central America and Mexico"
- November 1942. John Dickinson, "The Philosophy of Government in Our Earlier and Later History"
- November 1943. James B. Conant,* "The Advancement of Learning in the United States in the Post-War World"
- April 1944. René J. Dubos, "Trends in the Study and Control of Infectious Diseases"
- November 1944. Gilbert Chinard, "The American Philosophical Society and the Early History of Forestry in America"
- November 1945. Arthur H. Compton,* "Atomic Energy as a Human Asset"
- November 1947. Douglas S. Freeman,* "Young Washington"

IX

REPRESENTATION AT CELEBRATIONS OF SOCIETIES, INSTITUTIONS, ETC.

- March 24-26. National Conference on UNESCO, Philadelphia.
Thomas S. Gates and Luther P. Eisenhart.
- April 10. Inauguration of William Vermillion Houston as President of the Rice Institute. Harold A. Wilson.
- April 18-19. Fifty-first Annual Meeting of the American Academy of Political and Social Science, Philadelphia. Edwin O. Lewis and J. Henry Scattergood.
- May 7. One Hundredth Anniversary of the founding of the City College of the City of New York. Gano Dunn.
- May 16. Inauguration of George Dinsmore Stoddard as President of the University of Illinois. Roger Adams.
- May 17. Inauguration of Rosemary Park as fifth President of Connecticut College. John S. Nicholas.
- June 17. Bicentennial Celebration of Princeton University.
Thomas S. Gates.
- June 27. Formal opening of the Benjamin Franklin House, Craven Street, London, England, by the British Society for International Understanding. Sir Henry Hallett Dale, Arnold J. Toynbee, C. E. Kenneth Mees, and Linus C. Pauling.
- September 10-17. Centenary Celebration of the Ecole Française in Athens. David M. Robinson.
- October 1. Inauguration of Colgate Whitehead Darden, Jr., as President of the University of Virginia. Samuel A. Mitchell.
- October 17. Centennial Celebration of the Sheffield Scientific School of Yale University. Linus C. Pauling.
- December 3. Inauguration of Francis Xavier Talbot, S.J., as President of Loyola College. Francis D. Murnaghan.
- American Council of Learned Societies. Guy Stanton Ford, 1944-1948; Gilbert Chinard, 1947-1950.
- American Documentation Institute. Waldo G. Leland, 1947-1950.

National Research Council, Division of Foreign Relations. Detlev W. Bronk, 1945-1948.

American Year Book Corporation, Supervisory Board. Gilbert Chinard, 1943-.

REMARKS BY LINUS C. PAULING AT OPENING OF THE
BENJAMIN FRANKLIN HOUSE

As a representative of the American Philosophical Society, I am happy to extend its greetings to the British Society for International Understanding on the opening of the Benjamin Franklin House.

Benjamin Franklin was President of the American Philosophical Society from 1769 to 1790. He was its founder—either in 1727, when he began the Junto, or on May 14, 1743, when he published “A Proposal for Promoting Useful Knowledge among the British Plantations in America.” The full name of the Society is, in fact, “The American Philosophical Society held at Philadelphia for promoting useful knowledge.”

Franklin would have been happy to see today's event, and to know about the British Society for International Understanding, for what more useful knowledge is there than that which contributes to international understanding? Let us hope that the promotion of this useful knowledge will soon lead to the development among all the peoples of the world of the same understanding and recognition of brotherhood as exists now between Great Britain and the United States of America.

X

BIOGRAPHICAL MEMOIRS

JOSEPH QUINCY ADAMS
(1881-1946)

To Joseph Quincy Adams it was given to be successful in each of two careers distinct though closely related. First, by the time that he had reached the age of fifty years he had attained international eminence in the world of letters as one of the foremost authorities upon the literary history of England in the fifteenth, sixteenth, and seventeenth centuries and, more particularly, upon the life and writings of William Shakespeare and his fellows. Secondly, before his death in 1946, Adams had vitalized with his own spirit the highly specialized Library-Museum planned and richly endowed by Henry Clay Folger of New York, "for promoting and diffusing knowledge of the writings and history of Shakespeare."

Adams came of South Carolina stock. His grandfather's plantation was in Edgefield County in that state. His father, Joseph Quincy Adams, who had entered the ministry of the Baptist Church, was located, in 1881, in Greenville; and there, on March 23 of that year, Joseph Quincy the younger was born. His mother was Mamie Fouchée Davis Adams. The boy's education followed the conservative classical tradition of the South. The out-of-door life of the region gave to him a love of hunting and fishing that remained an integral part of his nature. At Wake Forest College in the neighboring state of North Carolina, young Adams received his baccalaureate and his master's degrees. He passed a year as head of the "Male Academy" in Raleigh. Then came graduate work at two American universities, with a scholarship at Chicago, where Adams studied under John Matthews Manly, and with a fellowship at Cornell. The year 1904-1905 was spent in England; in the summer of 1907 he studied at the University of Berlin. In 1905 began his long association with the Faculty of Cornell, from which university, in 1906, he received his doctorate. In two years he was made an Assistant Professor; and at the end of ten more he was Professor of English.

Perhaps this rapid ascent of the ladder of academic promotion followed the rather familiar pattern for the American university professor's way to renown—if not to wealth. But it was the *differentia* that counted: Adams, journeying abroad, developed a master skill in the acquisition, either for Cornell University or for himself, of material valuable for his spécial study: and, what was more important, acquainted himself with the work of English and German scholars. At Cornell he built up courses, undergraduate and graduate, which are remembered with deep appreciation by those who studied under him. Such were his Shakespeare course and his course for graduates upon Methods and Materials of Elizabethan Research. One who was devoted to him tells of his elaborate bibliographical indexing; of his dramatic manner of lecturing, with perhaps an occasional over-simplification of his own point of view; of the dialectic by which he sometimes chose the role of Devil's Advocate, drawing out the defence by another of his own position; of his speedy yet meticulous reading of dissertations; of his openness to conference; and, in all, of his unwillingness to spare himself.

But of chief significance was his productivity. Felix Schelling once wrote to Adams to thank him for his "fertile and successful scholarship." In brief summary, Adams published in 1923 *A Life of William Shakespeare* which brought instant acclaim even from some who could not accept all his conclusions. It has been described as "almost certainly the best done by any modern hand." For this the way had been paved by his earlier studies of the background in time, in place, and in persons, of Shakespeare's work. In 1917 he had published two books, *Shakespearian Playhouses; A History of English Theatres from the Beginning to the Restoration* and *The Dramatic Records of Sir Henry Herbert, Master of the Revels 1623-1673*. The year following the appearance of his biography of Shakespeare he published his *Chief Pre-Shakespearian Dramas* (1924). This, like the *Life* and most of Adams' books, was published in England also.

There were in this period of Adams' writing very many monographic papers, the editing of the Cornell Studies in English, and the preparation of important reviews. But his most ambitious undertaking was the beginning of what he planned as *The Adams Shakespeare*—the textual publication of the several plays. His

Hamlet was published in 1929 and his *Macbeth* followed two years later.

Up to his fiftieth year Adams had not married. But if there was an impression that he was a confirmed bachelor that opinion was happily dispelled, and Ithaca interested, when he married Helen Banks, of a well known Ithaca family. This union seemed to add one more tie to hold him at Cornell. But within a year he had made the decision to leave Ithaca and to begin a new life in Washington. Certainly the uprooting was not accomplished without a mental struggle.

Adams' second career began with his appointment June 7, 1931 to be Director of Research, or as the title was soon made to read, Supervisor of Research in the Folger Shakespeare Memorial Library.

The founder, Henry C. Folger of New York, long President of the Standard Oil Company of that state, had died in the previous year, 1930, while the books and manuscripts which he and his wife had so zealously collected were still in packing cases stored in New York and Brooklyn. When the text of Folger's will had been made public, Adams could learn in detail what had been briefly announced in 1928. Resisting alike pleas made for Stratford-on-Avon and for Chicago, Folger had decided upon Washington and upon a site in immediate proximity to the Library of Congress. The Folger Library, with its large endowment, was to be administered by the Trustees of Amherst College, where Folger had graduated in the Class of 1879. In 1931 Paul Cret's beautiful building began to take shape. The cornerstone had been laid before Folger died. As Director of the Library there was chosen in 1930 William A. Slade, excellently trained in librarianship both in and out of the Library of Congress. It was in April 1931 that Mrs. Folger sought the counsel of Adams; and his appointment followed a few weeks later. A little over a year before this Adams had presented to the Shakespeare Association of America, at a dinner in New York, suggestions as to the desirability of a "Shakespeare House," analogous to the various language "Houses" which had begun to appear in association with certain American universities. It was undoubtedly gratifying to him, as it was to Mrs. Folger, to find that he was in agreement with the founder's plan for something more than a library—for what might be called a library-museum.

The date selected for the dedication of the new Library was Shakespeare's birthday, April 23. The President of the United States, with many other notables, was in attendance; and Adams, the speaker of the occasion, delivered a scholarly discourse on "Shakespeare and American Culture." In this he had little to say about Folger or the Library; but the following year, in a handsome volume printed for the Trustees, Adams briefly summed up the wealth of folios and quartos, the thousands of other printed books, the manuscripts, and the material illustrative of music and the arts in general, which constituted the Library's holdings.. Nine years later in 1942 there was published what Adams called "A Report on Progress, 1931-1941." The first Director, Mr. Slade, had returned to the service of the Library of Congress in 1934, and Adams had then been made full Director. Thus his report of 1941 presented an account of his stewardship, as well as a more detailed review of the treasures accumulated by the Folgers.

If one remembers his flair for book-hunting one will understand with what enthusiasm Adams, who now had at his command the rich resources of the Library, threw himself into the determination "to develop," as he put it, "in a systematic and scholarly way the collections originally assembled by the Founder." Of his activity in acquiring he wrote: .

to that end he has personally examined, usually on the day received, virtually every dealer and auction-sale catalogue issued in America and England and many issued on the Continent, conducted extensive negotiations by letter with private owners, and each Summer, until the outbreak of war, visited the book markets of Europe.

Impressive and fortunate as were the results of Adams' acquisition policy and practice, his administration was equally important in bringing rapidly and effectively to the service of scholars the sources for which they had long been waiting. Drawing to his aid a staff of specialists,¹ he authorized the institution of a highly technical system of cataloging, secured establishment of fellowships in aid of research, and provided a reference service, not only for readers, but for those who must write from a distance. One of Adams'

¹ To Dr. James G. McManaway, Acting Director, and to his colleagues Dr. G. E. Dawson and Dr. Edwin E. Willoughby of the Folger Library, the writer of this sketch is indebted for valued assistance and for the privilege of examining some of the material prepared for a forthcoming memorial volume. He gratefully acknowledges also the help extended by Miss Josephine Banks, the sister of Mrs. Adams, and Miss Helen Banks Adams, Dr. Adams' daughter.

most important accomplishments was the institution of the fine series of "Folger Reprints" that began with the publication in 1936 of the unique and hitherto unreproduced quarto of *Titus Andronicus* (1594). In the introductions to this and to the succeeding reprints of rare works Adams continued to manifest the editorial talent which was so important a part of his genius. In this series was a partial compensation for the inevitable slowing up, by reason of administrative duties, of his productivity as an author.

Before his health began to fail, Adams had been the recipient of many honors. Amherst in 1939 and the University of North Carolina in 1946, bestowed on him the honorary degree of Litt.D., which degree his Alma Mater, Wake Forest, had given him many years before. He was made a member of the most important societies which had to do with Shakesperian scholarship. In 1935 he fell heir to the mantle of the Furnesses, as editor of the New Variorum Edition of Shakespeare. In 1940 the American Philosophical Society elected him to membership, but he did not "subscribe the Laws" until 1943.

Adams' death came November 10, 1946. His wife had died in 1935 leaving a daughter, Helen Banks Adams, who survives him.

The last of his scholarly writings was the essay on "The Office Book, 1620-1642, of Sir Henry Herbert, Master of the Revels," which was given first place in the congratulatory volume *To Doctor R.* (1946) in honor of Dr. Rosenbach's seventieth birthday—a testimony to a friendship which had included both the Folgers and their successor, Adams.

I cannot do better, in bringing this sketch to a close, than to repeat, with permission, the following lines from an editorial on Dr. Adams published in the *Evening Star* of Washington.

Something of Shakespeare's love of beauty was part of Dr. Adams' endowment. He had much of the Bard's wit and humor, too. But still more important was his kinship with the poet in terms of human sympathy. He possessed a wonderful affection for people and a marvelous comprehension of their joys and sorrows. Visitors to his office came away with a lasting impression of his gentleness and fellow-feeling. But back of Dr. Adams' generous demeanor was a character of rare distinction. He put into his labors a scrupulous integrity. While he was director nothing went into the Library untested. The pattern of organization which he developed for the institution sponsored by Henry and Emily Folger will be his monument. He was in effect a co-founder with them. . . .

ST. GEORGE L. SIOUSSAT

WILLIAM LETCHWORTH BRYANT
(1871-1947)

William Letchworth Bryant was born in Buffalo, New York, in 1871. He studied law in the office of his father, the late William C. Bryant, and practiced law for many years. His hobby, however, was his collections of Indian relics and later of Devonian fishes, the latter coming from many localities in the vicinity of Buffalo. He was an enthusiastic member of the Buffalo Society of Natural Sciences, where he brought together important collections and took an active part in the development of its plans for a new Buffalo Museum of the Natural Sciences.

He was Curator and Director of that Museum from 1909 to 1924 and first planned the experimental museum which was set up in one of the city parks and embodied novel or little used methods of exhibition and instruction. His major premise was that the visiting public would follow a one-way pathway along a series of exhibits, beginning with the essentials of physics and chemistry, passing to the stars and culminating in man. The experience gained in this trial museum was used by him and his successors in the detailed planning and exhibits of the large and splendid museum which was opened some years later. Here a central hall containing exhibits illustrating fundamental facts and principles of science led into a numbered sequence of halls, with Anthropology at the upper end.

For many years Bryant lived at the Buffalo Club. There he aroused the interest of his fellow members in various branches of natural history and secured their support of his plans for the museum. During the First World War he served in Europe in the Red Cross. From 1925 until his death on June 9, 1947, he was director of the Park Museum in Providence, Rhode Island. In 1928 he married Helen Antoinette Sheehan of Buffalo and is survived by his widow and daughter Marcia. He was honorary curator of fossil fishes of the New York State Museum at Albany, U. S. delegate to the International Congress of Americanists in Brazil, fellow of the Ohio Academy of Sciences, president of the Audubon Society of Rhode Island and a member of the American Philosophical Society since 1935.

Bryant's papers on the palæozoic fishes of New York, Ohio, Quebec, Wyoming, and Colorado were notable contributions to the

history of the early evolution of the vertebrates. They were the products largely of his own extensive field work in many localities, and in later years also of the discoveries of other palæontologists who recognized his authority in this and cognate subjects. The *Catalog of the Fossil Fishes in the Museum of the Buffalo Society of Natural Sciences* (1918) was prepared in collaboration with Dr. L. Hussakof of the American Museum of Natural History, New York. It pays grateful acknowledgments to Mr. Henry R. Howland of the Buffalo Museum for the help and encouragement given during the long period of preparation. After discussing the Devonian formations containing fossil fishes within fifty miles of Buffalo, the authors describe the various faunas of arthrodires, ptyctodonts, fin-fold sharks, acanthodians, dipnoans, crossopterygians, etc., many of which were allied with corresponding genera and species in Europe.

Bryant's paper "On the Structure of *Eusthenopteron*" (1919) was a signal contribution to knowledge of this presumably air-breathing Devonian fish, as a representative of the Crossopterygii, which foreshadowed the amphibians in the basic construction of their skeleton. Between 1917 and 1940 it was my privilege to exchange many letters with Mr. Bryant, mostly relating to the microscopic structure of the scales and surface plates of the ostracoderms and to the possible homologies of the skull plates of *Eusthenopteron*. Many beautifully clear microphotographs of his preparations accompanied his letters and he was always very generous in sharing his hard won knowledge and in loaning his material to those who were interested in the problems involved.

At Eighteen Mile Creek, near Buffalo, the Conodont Bed yielded an extensive fish fauna and a rich conodont fauna, the latter having been described by Hinde in 1879. Bryant's numerous conodonts from this layer were carefully figured and described by him in 1921. Here he reviewed the still baffling problem of the relationships of these minute fossils either to annelids or to fishes. Although leaning to the latter interpretation, he regarded the evidence as conflicting and indecisive.

An impression in shale of a small plate three millimeters in length from the Cambrian shales of Franklin County, Vermont, was described by Bryant in 1927. He notes the resemblances of its surface tubercles to the tesserae of certain ostracoderms, as possibly suggesting the Cambrian age of the ostracoderm stock. Very note-

worthy was *A Study of the Oldest Known Vertebrates Astraspis and Eriptychius* (1936). This was illustrated with numerous microsections with magnifications ranging up to 210, showing the complex, many layered exoskeletal plates and scales of these Ordovician ostracoderms.

William L. Bryant was a worthy successor of Newberry, Traquair, and other leaders in the study of Paleozoic fishes, and a patriotic citizen who contributed much to the educational and scientific museums of two American cities.

WILLIAM K. GREGORY

EDWARD POTTS CHEYNEY

(1861–1947)

Edward Potts Cheyney, distinguished historian, writer on social reform, and an active member of the American Philosophical Society for many years, was born at Wallingford, Pennsylvania, on January 17, 1861, and died after a short illness on February 1, 1947. He was descended from John, the first of the Pennsylvania Cheyneys, who came to America at the time of William Penn. John Cheyney bought land in Chester County, and speaks of himself in his will at the time of his death in 1722 as: "John Cheyney of Middletown of Chester County, Yeoman" bequeathing all his estate "both real and personal, both here and in Great Britain" to his sons, John and Thomas. A typical representative of the Cheyney clan as they increased and multiplied was Squire Thomas Cheyney of the Revolutionary War so charmingly and humorously described by Professor Cheyney in "Thomas Cheyney, a Chester County Squire: His Lesson for Genealogists."

Professor Cheyney was a great teacher and a writer of history with whom a certain originality of approach, so essential in all true scholarship, carried both conviction and challenge. This, coupled with sound critical methods, and the independent constructive thinking found in his writings won for him a foremost place as an interpreter of the past, especially of England, among historians both in America and Great Britain.

Dr. Cheyney's academic associations with the University of Pennsylvania, his Alma Mater, were continuous from 1884, when he graduated from the Wharton School, till his retirement as Professor Emeritus in 1934. During this half century he served the

University in many capacities. In 1897 he was elected Professor and Chairman of the Department of History, and in 1929 he was appointed to the Charles Henry Lea Professorship of History. His important contribution to the University came, of course, through his teaching and writings. Both in the undergraduate and graduate schools he was an inspiring and always stimulating teacher. His many students remember him with veneration and affection. Although he disliked administrative duties, his impress upon the educational policies of the University, particularly of the college, were considerable through his work as chairman of faculty committees. His *History of the University of Pennsylvania* (1942), written in connection with the bicentennial celebration is the official history of the University.

In the American Philosophical Society he is best remembered for his rugged individualism in his approach to the problems of the interrelations of the different fields of science and scholarship. Typical in this connection is the minority report he submitted on the findings of the majority of the Committee "On the Date of the Foundation of the Society."

Among his colleagues in the historical profession, Professor Cheyney was one of the last survivors of that remarkable group of elder statesmen under whose guidance the American Historical Association developed into the great professional organization it is today. An active but unobtrusive member of the Society during its formative years, he gradually became one of its outstanding leaders. In 1923 he was elected President of the Association. Prior to this he had been a member of the Council for two terms; Chairman for nine years of the Committee on the Justin Winsor Prize; Chairman of the Committee on Bibliography of English History for over two decades; and an editor of the *American Historical Review* from 1912 to 1920, serving as Chairman of the Board of Editors for much of that period. Even after his term as President of the Association he carried on for some years as chairman of the committee on the revolving fund for the publication of historical monographs.

Professor Cheyney's contribution to the "New History" and to improved methods of teaching was considerable. With his colleague, James Harvey Robinson, and Dana C. Munroe he projected *Translations and Reprints from the Original Sources of European History* making them available in attractive form and modest price

for classroom use. He was a pioneer in breaking away from the overemphasis on political and military history. Both by precept and example, he directed attention to the importance of the records of economic, social, and cultural history, witness: *English Towns and Guilds*; *Documents on Feudalism*; *Social Changes in England in the 16th Century as Reflected in Contemporary Literature*, and several others, culminating in his *Introduction to the Industrial and Social History of England*. During the middle years of his life his interest shifted from medieval and fourteenth-century England to the England of the sixteenth century. In this field he wrote his most ambitious work, *A History of England from the Defeat of the Armada to the Death of Elizabeth* (2 v. 1914-1928). Filling in a gap in English historiography between the works of Froude and Gardiner, it won for him a permanent and enviable place among English and European historians.

His textbooks have been widely used even in England, his ability for clear, lucid writing, coupled with respect for facts and a capacity for generalization accounting for successive editions and reprinting.

Despite a life devoted to history, Cheyney was not infrequently claimed by the natural scientists as belonging to their group, a claim based not merely on his rigid objectivity in the pursuit of knowledge, but on a deep-seated love of nature and the out-of-doors inherited from his mother's family. The beautiful country of his beloved Chester and Delaware Counties was an attractive region for the amateur geologist, botanist, and disciple of the Bartrams. As a close observer of natural phenomena he early responded to the views of Darwin. Moreover, the theory of evolution to a scholar of Cheyney's turn of mind had important implications for the interpretation of history. History, too, he reasoned, must follow an orderly or evolutionary process. History must have its laws—determinants—governing the advance of civilization. These he projected in his presidential address before the American Historical Association in 1923, and later expounded in his *Law of History and Other Essays* (1927) as: A Law of Continuity; A Law of Mutability; A Law of Interdependence; A Law of Democracy; A Law of Control by Free Consent; and A Law of Moral Progress. Here the critical scholar abandoned objective methods, became speculative, and turned philosopher in his search for syntheses. It aroused the critics, but he vigorously defended

the theses and the theory that the historian has not only the opportunity but the obligation to be philosophical. By way of contrast his rather humorous "Last Will and Testament (Academic)" written much later reveals the continuance of that practical sagacity in academic matters so characteristic of his thinking on such matters:

Teaching in the college should be directed to the needs of the better, not the poorer, students. A third, more or less, of the students should not be in college at all. Much labor on the part of the teachers and much distress on the part of students are caused by the hopeless effort to arouse minds that have little intellectual curiosity.

To his students, readers, and many friends a survey of his life work would not suffice without a reference to the man—the kindly, lovable Cheyney, whose rugged personality refused for so long a time to grow old. Till his retirement he radiated the simplicity and serenity of his nature, his generous kindness and warm human sympathy so admirably reflected in the portrait of him by his fellow Pennsylvanian Adolphe Borie, the original of which is appropriately hung in the University Library near the entrance to the Library of his friend and fellow historian, the late Henry C. Lea.

WILLIAM E. LINGELBACH

IRVING FISHER

(1867–1947)

Few members of the American Philosophical Society have approached the versatility of its founder so closely as did Irving Fisher. Though increasing specialization makes it ever harder to win distinction in more than one line, Fisher made his mark as a mathematician, economist, statistician, inventor, authority on personal hygiene and public health, publicist, and social reformer. Of Franklin's dazzling endowment, he lacked only humor and the understanding of human frailties that goes with it.

The son of a Congregational clergyman who died prematurely of tuberculosis, Fisher entered Yale at seventeen, did well socially as well as scholastically, aroused the interest of both Willard Gibbs and William Sumner, graduated in 1888, returned for advanced study, and received a doctorate in 1891. His dissertation, *Mathematical Investigations in the Theory of Value and Prices*, 1892, promptly became a classic, was translated into French, and made a European reputation for the young author.

There followed half a dozen years of high good fortune; then adversity. Appointed Assistant Professor of Mathematics in Yale, Fisher married a charming daughter of the distinguished Hazard family, and went abroad in 1893-1894 for a year's study. On returning, he wrote a text book upon geometry with a colleague, and by himself another on the infinitesimal calculus. According to some spicy authorities, not all mathematical economists are mathematicians. Certainly, Irving Fisher's interest in mathematics was not perfunctory; nor were his attainments negligible. The novel sundials he devised, and his icosohedral projection for mapping show that his early tastes and powers persisted throughout his life. Yet he deliberately chose economics as his major field, and treated mathematics mainly as a supremely useful tool. In 1895 his assistant professorship was shifted to political economy.

The calamity that interrupted the strenuous work and brilliant success of these early years was an attack of his father's malady. Nothing in his career revealed more clearly Irving Fisher's manliness, his desire to help others, or his quaintly formal mind than did his reaction to this threat. He spent the years 1898-1901 mostly in Colorado and California fighting a systematic campaign for life and health; then returned to Yale feeling that he had discovered how to live, and should teach the lesson to mankind. Assuredly, the regime that Fisher practiced during his four years' fight, and continued with variations through later life, served him well. Not many men could match his energy, or get so much enjoyment out of keeping physically fit. When close to eighty, Fisher was still inviting youthful guests to join him in a mile run before breakfast. He spread his gospel with apostolic zeal. The Life Extension Institute was only one of several agencies he organized or sponsored to promote healthful habits. The book on *How To Live*, written in collaboration with Dr. W. E. Fisk and rewritten with Haven Emerson, has gone through twenty-one editions and been translated into several languages. Fisher was a vigorous advocate and defender of the Eighteenth Amendment, and helped to launch an anti-tobacco league. Many a friend must recall affectionately as I do his kindly efforts to mend our evil ways. *Prohibition at Its Worst*, 1926, *Prohibition Still at Its Worst*, 1928, and *The Noble Experiment*, 1930, exhibit the social crusader at his fiery best and the scientific investigator at his rashest.

This intense concern with hygiene, private and public, did not diminish Fisher's devotion to any of his older interests, or prevent him from developing new ones. He could concentrate all his powers upon one project at a time, dispose of it for the moment, turn with equal singlemindedness to a quite different matter, then revert suddenly to the first. He seemed less a fusion of numerous personalities, like Franklin, than a procession of them. Each character in the cast that made up Irving Fisher came on the stage in turn, delivered a soliloquy, passed off, and in due season reappeared to develop further what he had said before. It was an extraordinary performance; but the audience wished now and then that the several characters might get better acquainted, so that the logician, for example, might check the reformer's wishful thinking, and that the reformer might teach the mathematical economist something about human foibles.

On returning to his professorship at Yale, Fisher began to elaborate upon the theme of his doctoral dissertation—fluctuations in the general level of prices: their effects, causes, measurement and prevention. Out of these studies, often interrupted and as often resumed, came a series of acute treatises upon the nature of interest and capital, which Fisher neatly summarized in the title of the culminating volume: *The Theory of Interest, as Determined by Impatience to Spend Income, and Opportunity to Invest It*, 1930. A somewhat more empirical line of books included *The Purchasing Power of Money*, 1911, presenting Fisher's celebrated "equation of exchange;" *Stabilizing the Dollar*, 1920, recommending a "compensated dollar," the gold content of which should be changed when an appropriate index of prices rises or falls; *The Making of Index Numbers*, 1922, demonstrating the "ideal formula" for price indexes, and *Booms and Depressions*, 1932, setting forth the "nine main factors" that cause depressions, the palliatives that can be applied, and the drastic measures that are needed to effect a lasting cure. How much original thought went into these books, and how effectively they stimulated other investigators is best indicated by the offices and honors thrust upon Irving Fisher by his professional brethren. The list is too long to recite; it includes virtually every mark of distinction economists and statisticians have to bestow. That other scholars also valued his work was shown by his election to membership in the American Philosophical Society in 1927.

What Fisher did for hygiene might have sufficed one man; what

he did for economic theory and practice might have overtaxed a second. In addition he became inventor, business man, and publicist. His "index visible," manufactured by a company he organized, proved highly profitable, and helped to finance the investigations and philanthropic campaigns partially listed above. In 1926 this company merged with others to form Remington Rand, Inc., and Fisher threw himself confidently into high finance. Until the crash of 1929, all seemed to go well; then most of his wealth vanished. He met this reverse as bravely as he had met physical collapse thirty years earlier, and once again learned how to live under altered circumstances. There was no decline in his mental activity. To this closing period belong his collaboration with Haven Emerson on *How To Live* and with O. M. Miller on *World Maps and Globes*, his constructive suggestions regarding income taxes, his advocacy of one hundred per cent reserves against bank deposits, and his plans for the Irving Fisher Foundation to continue work of the sorts he had done with such zest. No man of our times less needs or better merits an organization to keep his memory green.

WESLEY C. MITCHELL

MOSES GOMBERG¹

(1866-1947)

The death of Moses Gomberg on February 12, 1947, brought to a close the career of a brilliant scientist who had won recognition as one of the world's leading authorities in organic chemistry. He was born on February 8, 1866, in the small town of Elizabetgrad, Russia, the son of George and Marie Resnikoff Gomberg. From 1878 to 1884 he was a student in the Nicolau Gymnasium of his native town. In the latter year his father was accused of anti-Czarist activities and was forced to flee with his family, and his estate was confiscated. With help from friends they were able to go to Chicago where for a time hardship became their lot. Neither father nor son had a knowledge of English and they both worked in Chicago at whatever occupation they could find, and for a time at least in the stockyards. The son, however, with indomitable energy earned the means to complete his high school course and to enter the University of Michigan from which he was graduated

¹ Reprinted in part from *Jour. Amer. Chem. Soc.* 69: 2921-2924, 1948.

in 1890 with the degree of Bachelor of Science. An assistantship enabled him to continue in graduate work, and two years later he received the degree of Master of Science. He took his doctorate in 1894 with a thesis on the reactions of caffeine, under Professor A. B. Prescott.

Even before his appointment as instructor in 1893, he was planning to study abroad and in order to earn the necessary funds, he spent his spare time in analyzing materials for his numerous clients. His versatility is shown by the fact that his work included the analysis of minerals, water, fats and oils, foods, patent medicines, and drugs. He was also employed frequently as an expert witness in toxicology cases, and he thoroughly enjoyed matching wits with the opposing lawyers. However, he was greatly disturbed by the necessity of doing this type of work because it interfered with the progress of his research, and he dropped it as soon as possible. Thereafter he refused steadfastly to accept consulting work of any kind.

A leave of absence in 1896-1897 permitted a year of study in Germany and he decided to spend two terms in Baeyer's laboratory in Munich. Thiele suggested a problem involving the preparation of isonitramino- and nitroso-isobutyric acid, and this work resulted in a twenty-two page paper in Liebig's *Annalen*.

The third term of the year was spent in Victor Meyer's laboratory in Heidelberg. In discussing the choice of a problem, Gomberg said that he wanted to prepare tetraphenylmethane. Meyer, as well as other chemists, had been interested in the synthesis of this compound and had tried various methods but without success. Consequently, Meyer suggested other more suitable problems but Gomberg was determined to go ahead, and his confidence was well deserved for he was successful in his attempt. His method consisted in oxidizing triphenylmethanehydrazobenzene to the corresponding azo-compound and heating the latter to 110-120°. However, the yield was very poor, only 2-5 per cent.

His next step, when he returned to the University of Michigan, was to investigate the preparation of the related hexaphenylethane in the hope of obtaining this completely phenylated hydrocarbon in greater yield. Accordingly, triphenylchloromethane in benzene was treated with sodium but without appreciable action. However, when molecular silver was used, a colorless compound precipitated, which was assumed to be hexaphenylethane. An elementary an-

alysis gave low values for the percentage of both carbon and hydrogen. When further analyses gave the same result, it was concluded that the compound contained oxygen; and, after the silver had been shown to be free of oxide, it was suspected that oxygen of the air was oxidizing the initially formed hydrocarbon. By working in the absence of air, Gomberg obtained a hydrocarbon which was extremely unsaturated in its behavior. In benzene solution it absorbed chlorine, bromine, and iodine, and when exposed to air a stable peroxide was formed. In view of these remarkable properties, in his first paper (1900) on the hydrocarbon, Gomberg wrote, "The experimental evidence . . . forces me to the conclusion that we have to deal here with a free radical, triphenylmethyl, $(C_6H_5)_3C$. On this assumption alone do the results described above become intelligible and receive an adequate explanation." Following the publication of this paper, other chemists² immediately became interested in his hydrocarbon, and confirmed its striking properties. Moreover, it was shown that triphenylmethyl was but one of a large group of similar triarylmethyls.

Other investigations included the first synthesis of unsymmetrical tetraphenylethane and one of the first syntheses of pentaphenylethane, the preparation of benzyl ethers of carbonhydrates, the synthesis and study of certain dyes, a study of the $(ClO_4)_x$ radical, and the synthesis of biaryls by the diazo reaction (Gomberg reaction). However, an examination of his publications reveals that most of his life was devoted to the investigation of triarylmethyls and related compounds.

Professor Gomberg was a member of many learned societies: the American Philosophical Society (elected in 1920): a fellow of the American Association for the Advancement of Science; the Franklin Institute; the National Academy of Sciences; the American Institute of Chemists; the Netherlands Chemical Society, of which he was an honorary member; and the American Chemical Society, of which he was president in 1931. His achievements were recognized by the award of various honors: he was the recipient of the Nichols Medal in 1914; of the Willard Gibbs Medal in 1925; and of the Chandler Medal in 1927. He received the degree of Doctor of Science from the University of Chicago in 1929, the same

² Among the chemists who participated in the discussion of the structure of the unusual hydrocarbon were Baeyer, Markownikoff, Thiele, Flürschein, Schmidlin, Werner, Hantzsch, and Wieland.

degree from the Brooklyn Polytechnic Institute in 1932, and the degree of Doctor of Laws from the University of Michigan in 1937. He would have been less than human had he not been pleased by these marks of distinction, but none of them ever changed the even tenor of his ways. All evidences of his attainments were received with modesty that was one of his characteristic traits. He never sought preferment, and all forms of academic advertising were alien to his soul.

During the First World War he joined the group of civilian chemists working on gas warfare under the direction of the Bureau of Mines, prior to the organization of the Chemical Warfare Service. His assignment was the preparation of mustard gas; and although this was abhorrent to his nature, he accepted it without hesitation. Ethylene chlorohydrin was the intermediate which was required, and the method which he developed was the first in this country for the commercial preparation of this important compound. This work was done in his laboratory in Ann Arbor. Later in 1918, he was commissioned as Major in the Ordnance Department, acting as an advisor in the manufacture of smokeless powder and high explosives. Except for the year of study in Germany, this was the only break in his teaching career which extended over a period of forty-three years.

He was chairman of the Department of Chemistry from 1927 to 1936 when he retired. He stressed the necessity of a thorough basic training in all branches of chemistry with a minimum of specialization. He believed that teaching on the university level was impossible without research, and in regard to Ph.D. candidates he felt that the emphasis should be placed on the training of the candidate and not on the issuance of a publication. He had strong convictions on such matters and was not adverse to expressing them, but he never spoke with harshness or with intent to hurt. In his contacts with students, he was sympathetic, gave generously of his time, and was always ready to offer friendly advice.

Gifted with a remarkable memory, he presented his lectures with the full use of a wealth of historical material and so vividly that they left an indelible imprint on his students. A great teacher and scholar, he inspired his students by his methods and ideals, and his colleagues by the vigor and clarity of his mind. To this greatness, he added an innate kindness and unassuming modesty that endeared him to all.

He never married and lived quietly and happily with his younger sister.

He was a great scientist, a wise counselor, and a loyal friend whose memory will long remain a living force.

C. S. SCHOEPFLE

W. E. BACHMANN

EVARTS BOUTELL GREENE

(1870-1947)

Evarts Boutell Greene, DeWitt Clinton Professor Emeritus of American History in Columbia University and a member of the American Philosophical Society since 1931, died at Croton-on-Hudson, on June 24, 1947, within a fortnight of his seventy-eighth birthday. He came of sterling New England stock. His parents, the Reverend Daniel Crosby Greene and Mary Jane Forbes, were among the first American missionaries to establish themselves in Japan after the revolutionary movement of the 1860's had rendered that country receptive to foreign influence.

In Japan, at Kobe, Evarts Greene was born on July 8, 1870, the eldest of four brothers and three sisters, all of whom had subsequent careers of distinction. Like his parents, who long observed and beneficently participated in the evolutionary westernizing and modernizing of Japan, Evarts early developed a sympathy for the Japanese people and their culture—a sympathy which never left him. When he was fifteen, he was sent to the United States for American collegiate training. After three years as an undergraduate at Northwestern University, he transferred to Harvard, where he graduated in 1890, and where, after another three years as an assistant in the Department of History, he received the doctorate. Then, as Harris Traveling Fellow from Harvard, he pursued historical studies for a year at the University of Berlin; and on his return to America he entered upon an academic career as Assistant Professor at the University of Illinois.

From 1894 to 1923 Greene's life and work centered in Illinois. He passed rapidly to a full professorship and assumed an increasing amount of administrative responsibility. As head of the History Department, as chairman of innumerable faculty committees, and from 1906 to 1913 as Dean of the College of Literature and Arts, he was a chief factor in raising the University of Illinois to front

rank among its sister state universities. Simultaneously he made notable contributions, by both teaching and writing, to his chosen field of American colonial history. His first publication, a revised and enlarged version of his doctoral dissertation on *The Provincial Governor in the English Colonies of North America* (1898), has remained the authoritative study of the subject. In 1904 he brought out a volume on *The Government of Illinois*, and in 1905, in the well known "American Nation" series, a capital volume on *Provincial America*. He took great interest in the Illinois State Historical Library, serving as president of its board of trustees from 1910 to 1923, and planning and editing for it the monumental centennial history of Illinois which has continued to be a model and an inspiration for similar enterprises throughout the nation. He likewise busied himself on committees and in important offices of the American Historical Association. He was a member of its governing Council from 1908 to 1911, and secretary from 1913 to 1919.

In 1923 Greene accepted a call from Columbia University to the graduate chair in American colonial history formerly occupied by Herbert L. Osgood. It must have been a painful wrench for him to break loose, at the age of fifty-three, from his long and cherished association with Illinois and to settle in a quite different environment. He did so, as he explained, because he wished release from administrative duties and believed that the East, particularly the city of New York, provided richer opportunity for research in colonial history. Whatever doubts he may have entertained were quickly dispelled. He readily adjusted himself to his new surroundings, and was soon happy at Columbia, as Columbia was delighted with him. Here he spent the remaining sixteen years of his active academic career, giving unstintingly of himself alike to graduate students in seminar and lecture-hall and to colleagues in department and faculty. One could always expect from him not only critical acumen and accurate knowledge but a sympathetic hearing and wise counsel.

Greene utilized his new and enlarged opportunities by intensifying his own research and increasing his scholarly output. The survey of colonial history which he published in 1922 under the title of *Foundations of American Nationality* was subjected to painstaking revision and reissued in a new edition in 1935. In 1927 he completed an illuminating biography of his father which he

called *A New Englander in Japan*, and shortly afterwards, with the assistance of graduate students trained by himself, he published two valuable aids to scholarship in his field: *A Guide to Sources for Early American History in New York City* (1929), and *American Population before the First Federal Census* (1932). Meanwhile, he was carefully gathering material for two major writings which appeared soon after his retirement from active duty at Columbia. The one was a pithy and remarkably objective monograph on *Religion and the State in America* (1941). The other was a solid and discriminating volume on *The Revolutionary Generation, 1763-1790*, which he contributed to the "History of American Life" series (1943). As an author, all of Greene's work was characterized by meticulous attention to sources and the utmost judiciousness in presenting detailed findings, rather than by facile writing or bold generalization. The caution of the scholar reinforced the modesty and restraint of the man.

Greene's activities were by no means confined to a particular university or to teaching and writing in a particular field of history. Not only was he largely instrumental in building up a department of Japanese culture at Columbia, but through the American Council of Learned Societies, of which he was a leading member from 1933 to 1936, he promoted programs of Japanese study at other universities. Moreover, he continued to perform signal service to the American Historical Association. He was a member of the editorial board of its *Review* from 1923 to 1927, and chairman of the committee which materially increased the Association's endowment. He was the prime mover in establishing the national committee on legal research, and served as its chairman from 1930 to 1934. He concerned himself with the betterment of inter-group relationships in the United States and made valued contributions to the National Conference of Christians and Jews. In his last years he took keen interest in the American Scenic and Historical Preservation Society and conducted for it an important survey of the Hudson Valley.

Greene was a prominent member of many academic and learned societies. He held honorary degrees from Dartmouth, Illinois, Rochester, and Lehigh. He was a Fellow of the American Academy of Arts and Sciences. In 1930 he was President of the American Historical Association. After his retirement from Columbia and withdrawal to the quiet hermitage which his devoted sister, Mrs. Charles Griffin, maintained for him at Mt. Airy in Croton, he be-

came an honored and active, if somewhat amused, member of the local Rotary Club.

Evarts Greene was respected and honored not only for what he did but for what he was. While possessing in high degree the proverbial "New England conscience" and rigidly heeding its dictates in his own conduct, he was ever generous and tolerant toward persons of dissenting views. There was nothing provincial about him; and while appreciative of alien peoples and cultures from Japan to Germany, he was yet an American patriot in the best sense of the term. He was the soul of gentleness and patience, though he could, and not infrequently did, evince a truly righteous indignation about injustice or sham. He enjoyed a joke even when he was its object, and his occasional absent-mindedness was but a reflection of his utter lack of selfishness or self-seeking. He was integrity personified, and Diogenes would have found in him the honest man. He lived up to the finest ideal of "the gentleman and the scholar."

CARLTON J. H. HAYES

PIERRE JANET

(1859-1947)

For two generations Pierre Janet stood preeminent among the psychologists and psychopathologists of France, a citizen of the intellectual world. At the age of eighty he gave a notable address on social behavior, and in the last years of his long and exceedingly useful and productive life he was busily engaged on an ambitious work on the psychology of belief—psychopathic, religious, scientific, historical—and of mysticism. Successor to Ribot at the Collège de France and contemporary of Binet, Freud, and Prince, his influence on the development of psychology and his contribution of fact and theory are no less significant than theirs. Pierre-Marie-Félix Janet was born in Paris May 30, 1859 and he died in the city of his birth February 24, 1947. He was elected a foreign member of the American Philosophical Society in 1940.

His ancestral history includes the transition from peasant to world-famous productive scholar in four generations. Pierre-Etienne Janet, his great-grandfather, intelligent, ambitious and eventually successful in business, came from the south of France to Paris where he established a book store. His grandfather, Pierre-

Honoré, became a publisher of books and of music. So likewise Jules, his father, preferred intellectual activity to business and collaborated in the preparation of a work on general jurisprudence. An uncle, Paul Janet, noted historian and philosopher, profoundly influenced Pierre's educational and vocational decisions, and a brother named Jules distinguished himself in psychopathology.

In his teens Pierre developed a lively interest in the natural sciences, especially in botany. In an autobiography¹ written when he was seventy-one he states that at eighteen he was very religious. Very early he became an enthusiastic collector of plants, and even in old age the search for rare specimens—their analysis, identification, and preservation—was his chief avocation, and his extensive herbarium continued to the end a treasured possession. As collector of botanical specimens he became skilled in observation, comparison, and discrimination, and acquired the habits of patience and care which are indispensable to the investigator. How different might have been his professional career had he become interested in the vital processes, behavior, and conduct of organisms instead of in preserved specimens—in physiology instead of in taxonomy. That his hobby significantly influenced his life is indicated by the methods of work and patterns of thought which are exhibited by his writings. Perhaps it was chiefly because of it that he became as he intimates in his autobiography² a fountain pen psychologist rather than an experimentalist!

His uncle Jules, whose example greatly encouraged him, advised that he seek expression for his scientific and philosophical interests by studying medicine and it was thus that he was led into medical psychology as profession. At twenty-two Pierre's studies were interrupted because of financial circumstances and for several years he taught philosophy in Le Havre. He then completed his academic training in the arts and in medicine and for the remainder of his life devoted himself to research in psychology and to clinical psychopathology.

Janet's academic history is brief and simple, for in each of his major positions he spent decades instead of merely years. Proposed by Charcot, he became connected with the psychological

¹ Murchison, Carl A. (ed.), *History of psychology in autobiography* I:123-133, Worcester, Mass., Clark Univ. Press, 1930.

² *Ibid.*, 126. "My psychology has become the 'psychology of the fountain pen.'"

laboratory at the Salpêtrière in 1890 and for fifty years continued in the post which eventually was designated as Directeur, Laboratoire de Psychologie Pathologique, Clinique de la Salpêtrière. First as substitute for and later as successor to Th. A. Ribot, he entered the service of the Collège de France where in 1902 he became Professor of Psychology, and thirty-four years later Professor Emeritus. In the years 1898–1902 he lectured at the University of Paris; in 1906 at Harvard University, and in 1925 at the University of Mexico. For the Fourth International Congress in Psychology, Paris, 1900, he served as Secretary, and for the Eleventh Congress, Paris, 1937, as honorary President. With his colleague Georges Dumas he founded the *Journal de psychologie normale et pathologique* in 1904, and both he and Dumas were made honorary editors in 1937. In the course of his long and very active life many honors came to him, together with recognition and gratitude from his students and colleagues the world over.

On the occasion of the Centenary of Théodule Ribot our fellow member of the American Philosophical Society, James B. Conant, speaking for the President and Fellows of Harvard College, paid homage to Janet in these words:

No less warmly does Harvard University welcome the occasion to honor Pierre Janet on the Semi-Centennial of his famous thesis on psychological automatism. When our present medical buildings were opened in 1906, it was to France and to Janet that Harvard turned for instruction concerning the nervous disorders. He responded with an unforgettable series of lectures on Hysteria, whose pages, superb in their penetrating description and lucid concepts, are still eagerly studied in America. Not content to rest upon his illustrious contributions to Psychopathology, Janet has extended his researches from the disordered mind to the healthy one, accomplishing no small result in the supremely important task of clarifying man's dim understanding of reflection, will, and belief.³

The life-long and compelling interest of Pierre Janet was the discovery of the "truth," as naturalistically defined, and its insightful application to man in health and disease. With rare skill, energy, and enthusiasm he sought to realize his ideal of science and to achieve his scholarly objectives. For him psychology was an objective science—of conduct as well as behavior, as he deemed the latter concept too narrow. The quality of his imagination and his

³ *Centenaire de Th. Ribot. Jubilé de la Psychologie Scientifique Française, 1839-1889-1939, Adresse de l'Université Harvard, 82, Agen, Imprimerie Moderne, 1939.*

desire for objective statement are well exhibited by this paragraph from the introduction (page xxii) to the second edition of his Harvard lectures on "The major symptoms of hysteria." Although these lectures were given in 1906, this introduction was written in 1920.

In all the mental diseases, oscillations of this kind are observed which bring about falls to more or less inferior levels and leave the subject for a longer or shorter time at the level to which he has fallen. The hierarchic table of the various activities will be established one day, and such or such a psychosis will be determined by the level to which the depression falls in the various phases of this disease; in a word, this disease will be determined by drawing the curve of the psychologic depression in the evolution of the disease, and by showing that this curve is characteristic. In many psychoses, in confusions, in toxic deliriums, in dementias, the curve descends very low, as far as the level of elementary intellectual activities or of reflex activities. But we may give the name of hysteria to a certain curve of mean depth which shows frequent oscillations between mental laziness and a more or less profound aboulia. It is these oscillations, these depressions to a mean depth that account for the insufficiencies of the mental synthesis and the various impulsions which psychologic analyses had first shown us under the apparently physical symptoms of hystericals.

As teacher and lecturer, clinical psychologist and psychotherapist, and as writer, Janet labored indefatigably. In each of these three categories the sum of his activities is prodigious. Nearly sixty years of teaching and lecturing extended his aid and influence to thousands of appreciative students, for he was master of clarity, logical development, and concreteness and from his great wealth of clinical observations he always was able to illustrate fact or principle from case histories. The victims of mental disturbance or disease, his patients, whose condition he painstakingly observed with analytic skill and recorded in detail, number thousands. These case histories eventually constituted research materials for years of inquiry into the nature of mental disease and of normal mentality. There resulted the discovery of various mental mechanisms, and the development of his concepts of psychological analysis—as contrasted with Freudian psychoanalysis—dissociation, mental levels, energy, tension, strength, and weakness.

As writer Janet was facile and prolific. His bibliography of professional contributions includes at least thirty books and nearly one hundred other items. The following chronologically arranged

examples of book titles indicate both the range and nature of his intellectual interests and his major contributions to psychological science. The list includes many of his most influential books, of which several are available in English.

L'automatisme psychologique, 1889; *Bacon et les alchimistes*, 1889; *L'état mental des hystériques*, 2 v., 1892; *Névroses et idées fixes*, 2 v., 1898; *Les obsessions et la psychasthénie*, 2 v., 1903; *The major symptoms of hysteria*, 1907; *Les névroses*, 1909; *Les médications psychologiques*, 3 v., 1919; *La médecine psychologique*, 1923; *Eléments de psychologie pathologique*, 1925; *De l'angoisse à l'extase: études sur les croyances et les sentiments*, 2 v., 1926-1928; *La pensée intérieure et ses troubles: compte-rendu intégral du cours de psychologie expérimentale et comparée au Collège de France*, 1927; *L'évolution de la mémoire et de la notion de temps*, 1927-1928; *L'évolution psychologique de la personnalité*, 1930; *La force et la faiblesse psychologique*, 1932; *L'amour et la haine*, 1932; *L'intelligence avant le langage*, 1936; *Les débuts de l'intelligence*, 1937.

By his studies in human psychopathology Janet was led finally to the conclusion that psychology is essentially a science which should provide description of the development and evolution of behavior and conduct in individual and race. This highly significant outcome of his experience finds expression in a recent discussion of his life work by his colleague Meyerson:

But in respect to the diseased, Janet has felt the importance of a psychology of activities yet more inclusive, of which that of the diseased assuredly should constitute a chapter, but only a chapter. Perhaps the essential message which he has left us should be interpreted thus: to develop a genetic psychology which shall be a complete history of the activities and psychological functions of man.⁴

For those who read as they run in order to keep up with change, Pierre Janet's discoveries outlived attention and acclaim, so short is the memory of man and so rapid the development of psychological science. Only by systematically reviewing his life work in its historical relations and perspective may one get a just and reliable estimate of its importance. Historians undoubtedly will rank him much higher among the scientists of his era than do most

⁴ Meyerson, I., *Pierre Janet et la théorie des tendances*, *Jour. de psychologie normale et pathologique* 40: 19, 1947.

of those who today as psychopathologists or as psychiatrists are active in the paths which he helped to break.

ROBERT M. YERKES

HERBERT SPENCER JENNINGS

(1868-1947)

In the death of Herbert Spencer Jennings at Santa Monica, California, on April 14, 1947, the career of one of the most notable biologists of this century came to an end. He was born at Tonica, Illinois, April 8, 1868, and was named for the author of *Synthetic Philosophy*, the second volume of which series on *Principles of Biology* appeared in 1866. This naming throws light on the ideals and hopes of his parents and it may have influenced the career of the young man himself, who later so greatly honored that name by his own analytic and synthetic philosophy.

At the early age of twenty he became Assistant Professor of Botany and Horticulture in the Agricultural and Mechanical College of Texas (1888-1889). Four years later he graduated from the University of Michigan with the degree B.S. (1893). While still an undergraduate he began a systematic study of the "Rotatoria of the Great Lakes and some inland lakes of Michigan," which was published in the *Bulletin* of the Fish Commission of Michigan in 1894. This earliest work was followed by four others on Rotifers within the next nine years, during which time he served for a while as Director of the Biological Survey of the Great Lakes conducted by the U. S. Fish Commission.

Immediately after receiving his bachelor's degree he went to Harvard for graduate work, where he received the A.M. in 1895 and Ph.D. in 1896, his doctoral thesis being on "The Early Development of *Asplanchna herrickii*, de Guerne: A Contribution to Development Mechanics" (*Bull. Mus. Comp. Zool.* 30: 1-117, 1896). This was a very thorough study of cell-lineage and *Entwicklungsmechanik* in a species of Rotifer which he had collected in Lake Michigan. It is the one and only study in this field which Jennings ever undertook or at least completed, but it showed his great ability in dealing with a complex and difficult subject in a masterly manner.

After receiving his doctor's degree he was awarded the Parker travelling fellowship by Harvard, and he spent the year 1896-

1897 at Jena in the physiological laboratory of Professor Max Verworn. Here he began that series of remarkable studies on the "Reactions to stimuli of unicellular organisms" which he continued with great activity for more than ten years, and which formed the basis of all his later work. His first paper on behavior in *Paramecium* was published in the *Journal of Physiology* (British), and at its close he expressed thanks to Professor Verworn for guidance and assistance and to Director Biedermann for the courtesies of the Institute, but there is no doubt that this work, as indeed all his later work, was essentially his own, for while Jennings was always in touch with the spirit of the times, he was peculiarly independent and original in all his work.

On his return to the United States he served for one year (1897-1898) as Professor of Botany at the Agricultural College of Montana, and for another year (1898-1899) as Instructor in Zoology at Dartmouth. During the next three years (1900-1903) he was first an Instructor and then Assistant Professor of Zoology at the University of Michigan. In these five years after his return from Germany, he published in the *Bulletin* of the U. S. Fish Commission and in the *American Naturalist*, three monographs on the "Rotatoria of the United States." He also completed ten additional "Studies on Reactions to Stimuli in Unicellular Organisms," and published most of them in the *American Journal of Physiology*; while four other papers on behavior, not included in this main series were published in other journals. While at the University of Michigan he also published, with Professor Jacob Reighard, a text-book on the *Anatomy of the Cat*.

His epoch-making work on the behavior of unicellular organisms attracted the attention of scientists everywhere and began to bring him promotions and increased opportunities. From 1903 to 1905 he was Assistant Professor of Zoology in the University of Pennsylvania; from 1903 to 1904 research assistant in the Carnegie Institution of Washington; in 1904 he became a member of the first board of editors of the *Journal of Experimental Zoology*; in 1906 he was elected a trustee of the Marine Biological Laboratory at Woods Hole, and in the same year he was called to Johns Hopkins University as Assistant Professor of Experimental Zoology and promoted to a full professorship the following year. After the death of Professor W. K. Brooks he was in 1910 promoted to the Henry Walters professorship of Zoology and made Director of the labora-

tory at Johns Hopkins. This position he held until his retirement for age in 1938. But although he had reached the age of seventy he was still very active in research and he accordingly accepted the position of research associate in the University of California at Los Angeles in 1938, which position he occupied until his death.

His work on the reactions of *Paramecium* and other unicellular organisms reached a splendid climax in his monograph entitled, "Contributions to the Study of the Behavior of Lower Organisms" (*Carnegie Institution of Washington, Pub. No. 16: 1-256, 1904*). But this did not end his researches in this field for he continued to work on various problems in behavior for many more years. Between 1905 and 1907 he published four papers on regulation and modifiability of behavior in sea-anemones, earthworms, and starfish; three of these appeared in the *Journal of Experimental Zoology*. In 1908 six additional papers appeared on behavior in relation to psychology; indeed, the impact of his researches on psychology was of great importance and was emphasized in many later papers. He also recognized the beginnings of social behavior in his little animals and some of his latest papers dealt with this theme.

In 1908 Jennings began the study of life cycles, age and death, heredity, variation, and evolution in protozoa, and the greater part of his later researches dealt with some of these large and important subjects. No less than forty-five separate publications are concerned with these themes, one of the largest of these appeared in the *PROCEEDINGS of the American Philosophical Society*, 47: 393-546, 1908. It is impossible in a brief space to do justice to these notable communications; they deal with topics which have for many years given rise to hypotheses and speculations but which are here treated in a rigidly experimental manner. As a result much error has been cleared away and firm foundations laid for further progress.

Jennings' researches on the fundamental properties of living things led him to many important philosophical conclusions regarding life and death, vitalism and mechanism, freedom and determinism, etc. These conclusions were published in a score of papers in some of the leading philosophical journals as well as in biological ones, and they have had an important influence on thought in these fields. In contrast with the many-volumed works on the "Philosophy of the Organism," etc., of some professional philosophers, his seminary report on "Life and Matter from the standpoint of radically experimental analysis" is a masterpiece of concentrated

wisdom (*Johns Hopkins University Circulars*, No. 270: 3-20, 1914).

He did not hesitate to apply to man and his affairs many of the principles which he had discovered in lower organisms, for he held that while there was great diversity in details among living things there was also fundamental unity in principles. On the subject of determinism and human conduct, he claimed that, "Experimental determinism is the basis for formulatable science, rational conduct of life, and for creative evolution." His interest in social problems was keen, and he especially objected to supposed biological evidence of the inferiority of certain races or classes, or the claim that amelioration of the struggle for existence results in deterioration of the stock. His convictions on these and other social subjects are summarized in his books, *Prometheus—Or Biology and the Advancement of Man* (1925) and *The Biological Basis of Human Nature* (1930). He published nine books of permanent value in addition to scores of monographs and research works, and he was never idle but was always intensely active in spite of long-continued ill health.

He had the satisfaction of knowing that his work was highly appreciated, but he bore his honors lightly as becomes a sincere searcher for truth. He was elected a member of the American Philosophical Society (1907), of the National Academy of Sciences in 1914, the American Academy of Arts and Sciences, the Academy of Natural Sciences of Philadelphia, American Society of Naturalists (President, 1911), American Society of Zoologists (President, 1909), Honorary Fellow of the Royal Society of Edinburgh, of the Royal Microscopical Society, Corresponding Member of the Société de Biologie de France, and of the Russian Academy of Sciences. He was a recipient of the Leidy Medal of the Academy of Natural Sciences of Philadelphia and he received the Walker Prize of the Boston Society of Natural History. He was an active member of the Editorial Boards of the *Journal of Experimental Zoology*, *Genetics*, *Biological Bulletin*, and *Human Biology*.

Universities of Michigan, Pennsylvania, Chicago, and Oberlin College conferred on him the degree of Sc.D., and Clark University, Pennsylvania, and California gave him the degree of LL.D. He was visiting professor at Keio University in Tokyo in 1931-1932; Eastman Professor and Fellow of Balliol College, Oxford, 1935-1936. He gave the Terry Lectures at Yale in 1933; the Vanuxem Lectures at Princeton in 1934; the Leidy Lectures at Pennsylvania in 1940; and the Patten Lectures at the University of Indiana in 1943.

Although, to a large extent, he lived in his research work, he never shirked his obligations as a public-spirited citizen, conscientious teacher and guide of students, or cooperative and generous friend. Hundreds who knew him intimately remembered him with affection and esteem.

In 1898 he married Mary Louise Burrige, an artist of recognized ability, and for forty years a constant companion and helpmate to her husband and a charming hostess to very many students and visitors at their home. She died in 1938. Their one son, Burrige, survives and carries on scientific work in industry and invention. In 1939 he married Lulu Plant Jennings, the widow of his brother, and they made their home in Los Angeles, California. For the year preceding his death, at a hospital in Santa Monica, Dr. Jennings was seriously ill, and this was the only year in more than forty years of professional life which did not see some important publication by him. He was a really great man, a distinguished scientist and philosopher, and the world is wiser and better for his having lived in it.

EDWIN GRANT CONKLIN

CHARLES ATWOOD KOFOID

(1865-1947)

Charles Atwood Kofoid, son of Nelson and Janette (Blake) Kofoid, was born at Granville, Illinois, on October 11, 1865. His academic life began at Oberlin College, where in 1890 he received the degree of A.B. From Oberlin he transferred to Harvard University, where he entered the Zoological Laboratory to study in his chosen field under Professor Edward L. Mark. At Harvard he obtained the degree of A.M. in 1892 and of Ph.D. in 1894. He became Instructor in Vertebrate Morphology at the University of Michigan in 1894 and in 1895 he was appointed Superintendent of the Biological Station at the University of Illinois in Urbana. In 1897 he was made Assistant Professor of Zoology at the University of Illinois and in 1898 Superintendent of the Natural History Survey in that state. In 1900 he removed to Berkeley, California, where he became Assistant Professor of Zoology at the State University. Here in 1910 he was made Professor of Zoology and head of the Zoological Department. While he was at the University of California, Dr. Kofoid served as Assistant Director of the Scripps

Institute of Biology, Associate Naturalist on the Agassiz Expedition to the Eastern Tropical Pacific, Acting Director of the San Diego Biological Station, and Visiting Professor of Biology at the Tohoko Imperial University, Japan. In 1894 he married Carrie Prudence Winter of Middlefield, Connecticut. He died at the age of eighty-one of a heart attack on May 30, 1947, in Berkeley, California.

As a zoologist Dr. Kofoid was a student of wide interests. His thesis for the doctorate, entitled "Cleavage in *Limax*," dealt with the intricate problem of cell-lineage in this slug. He had always been deeply interested in marine biological stations and during his life he visited and worked at many such institutions. His intimate acquaintance with these afforded him material for some half-a-dozen important papers in the principal American and European stations. Such studies led him into oceanography, and his activities in this direction induced him to invent appliances such as the self-closing net and bucket, important in oceanographic tests. These studies helped in his investigation of the plankton, the floating microscopic plants and animals of marine and continental waters, thus affording him material for a number of contributions. He also gave much attention to the ship-worm, *Toredo*, and its damage to wooden ship-bottoms and other timber constructions in the sea. These investigations led him to study on land the damage to wooden structures from white-ants or termites and to write several important reports on the activities of these animals. The protozoan parasites contained in the intestines of these small insects were made the subjects of some six or eight papers by him. During the First World War Dr. Kofoid, as a member of the United States Sanitary Corps, entered with enthusiasm into the study of human parasites, but as a critic of his work remarks, many of his assumed discoveries and scientific descriptions in this field failed of confirmation because of his inexperience in this general subject. They have since been shown to be misinterpretations.

Dr. Kofoid's zoological reputation rests not so much on his numerous and diversified interests in animals as on his intense and protracted studies on the fresh-water and marine single-celled creatures, the water-inhabiting protozoans. In a total of ninety or more publications by him, perhaps a third are devoted to these animalcules and particularly to those known technically as the *Dinoflagellata*. Throughout a long, active life his interest in these minute creatures never abated, and few scholars can point to as

lengthy a series of contributions as Dr. Kofoid can on the microscopic structures and the activities of these interesting and important protozoans, some of which are so abundant at times as to color vast areas of the ocean surface.

As a result of these scientific attainments, Dr. Kofoid was elected to membership in many European and American scientific societies. He was further invited to serve on the editorial boards of numerous journals. He was the recipient of prizes and honorary degrees from both foreign and American institutions. He became a member of the National Academy of Science in 1922 and of the American Philosophical Society in 1924.

GEORGE HOWARD PARKER

FRANK RATTRAY LILLIE

(1870-1947)

Dr. Lillie died in Chicago on November 5, 1947 after an illness that had incapacitated him for five months. With his passing, the American Philosophical Society loses a member of thirty-one years' standing and science one of its most distinguished and effective leaders.

Frank Rattray Lillie was born June 27, 1870 in Toronto, Ontario. Three of his grandparents were of Scottish birth and ancestry, who had come to Canada in the first half of the nineteenth century; the fourth, his maternal grandmother, was a descendant of Loyalists, who went to Nova Scotia from Salem, Massachusetts, during the Revolutionary War.

He attended school in his native city, entered the University of Toronto at the age of seventeen, and received the B.A. degree in 1891, having pursued the natural science group of studies. While in college he became much interested in natural history and with a more experienced friend made collections of insects and fossils. It was then that he decided upon a life devoted to science and not to enter the ministry, as had been the family expectation. Both of his grandfathers were Congregational clergymen.

As an undergraduate, Lillie came into contact with two distinguished biologists on the faculty of the University, Dr. A. B. Macallum and Dr. R. Ramsay Wright. From the latter he acquired an early interest in embryology, which was to become his life work; from the former, no doubt, the physiological point of view, which is so evident in his research.

In the summer of his graduation he attended the course in embryology at the Marine Biological Laboratory, Woods Hole, where he first came under the influence of the late Professor Whitman, then Director of the Laboratory. Lillie went with Whitman to the newly established Clark University as fellow and one year later accompanied him in the same capacity to the University of Chicago, taking his Ph.D. there in 1894. After serving five years as Instructor in Zoology at the University of Michigan and one year as Professor of Biology at Vassar College, he returned to Chicago as Assistant Professor, remaining there for the rest of his life. He became Professor of Embryology in 1906, Chairman of the Department of Zoology on the death of Professor Whitman in 1910, later Andrew MacLeish Distinguished Service Professor, and finally in 1931 Dean of the Division of Biological Sciences.

Lillie early gave evidence of ability in affairs and a readiness to assume responsibilities. After some years as head of the course in embryology at Woods Hole, he was appointed Assistant Director of the Laboratory and succeeded Professor Whitman as Director on his retirement. He held this office for seventeen years and became President of the Corporation and Board of Trustees in 1925, to continue in this capacity for seventeen years more. His personality and his administrative ability in the laboratory inspired confidence, which spread in scientific circles and attracted attention from the foundations and private benefactors. It was no accident, then, that the Marine Biological Laboratory flourished. In this period its permanent quarters were erected, first a wing donated by Mr. Charles R. Crane, and later the main building, affording excellent facilities for a large number of investigators. With this came endowment and adequate provision for the library, which has now grown to be one of the most complete of its kind in the world. Of course, many different persons and many circumstances contributed to this development—Lillie would have been first to recognize this—but the various elements were held together and guided by his effective leadership.

Lillie's concern with marine zoology naturally led to an interest in the ocean itself. In this he met with encouragement from Dr. Wickliffe Rose, President of the General Education Board. Together they agreed upon a plan for an institution in broad outline, which Lillie laid before the National Academy of Sciences

at the meeting in 1927, with the consequence that he was appointed Chairman of a committee "to consider the share of the United States of America in a world-wide program of oceanographic research." The committee made a thorough study of the question, reporting to the Academy in 1929. In the following year the Rockefeller Foundation made a grant which ultimately reached the sum of \$3,000,000 for the establishment of the Woods Hole Oceanographic Institution. Lillie served as President for eleven years, and the Institution now has a long record of achievement in research on the ocean. In recognition of these services, the National Academy conferred upon him the Agassiz Medal in 1940.

His last important administrative assignment at the University of Chicago was the organization of the Division of Biological Sciences, a new departure in university administration, demanding ability of a high order. The new division, of which he served as Dean from 1931 until his retirement in 1935, included not only the usual biological departments but also psychology, preclinical and clinical medicine, and various other departments *incertae sedis*, such as home economics and physical culture. Through his common sense and understanding of the scope and relationship of the different disciplines, he brought these departments into closer union to their great mutual benefit.

Lillie was drawn into the affairs of the National Research Council early in its history. He represented the American Society of Zoologists for four years in the Division of Biology and Agriculture, serving as Vice Chairman of the Division in the year 1921-1922 and as Chairman the following year. It was during the latter term that the National Research Fellowships in the Biological Sciences were established through an initial grant of \$325,000 from the Rockefeller Foundation, and Lillie served as Chairman of the Fellowship Board from its inception until 1931.

Shortly after the Committee on Problems of Sex was set up in the Division of Medical Sciences with liberal funds for grants-in-aid, Lillie was appointed a member, a position which he held for about fifteen years. He brought to this group wide knowledge of the relation of internal secretions to sex-differentiation, derived from his own experimental work, thus contributing materially to the important work of this committee, which has been one of the principal factors in furthering research in this field.

In 1935 Lillie, who was about to retire from his university posi-

tion, was elected simultaneously President of the National Academy of Sciences and Chairman of the National Research Council. This unusual action was taken in order to relieve a situation that had arisen in the relations between the Academy and the Council, which harked back to the appointment of the Science Advisory Board several years before and which required a man of Lillie's poise and experience to adjust. The task was soon accomplished, so that he was able to resign the chairmanship after one year, while retaining the presidency of the Academy for the full term of four years. He has said that among the offices he has held in various scientific societies, he valued these two most.

With all the varied administrative duties with which Lillie was occupied throughout his career, his interest and productivity in research never flagged. It was only in the two latter years of the deanship that the stream of published papers stopped temporarily to be resumed on his retirement. His fields of work were varied and each one that he entered was enriched.

His doctor's dissertation on the development (cell lineage) of the fresh-water mussel established his reputation as a young investigator of great promise. Such studies at that time were attracting much attention and constituted an important advance in the science of embryology. However, he soon struck out into the experimental field and, aside from conducting several studies on regeneration and on the effect of temperature on development, he extended his investigations to subjects more closely related to his work on cell lineage, such as differentiation without cleavage, cell inclusions, the structure of protoplasm, and the physical basis of the polarity and symmetry of the organism. A product of his teaching duties as professor of embryology was an excellent textbook on the *Development of the Chick*, which after forty years still remains one of the best texts in the field of embryology.

His work on early development and the constitution of the egg protoplasm led to the study of the fertilization of the egg, a subject that was to engage him and his students for ten or more years. In this, too, his physiological approach departed from the more conventional lines. He introduced new ideas, perhaps ahead of their time, pointing out the similarity of the reactions between egg and sperm to certain immunological phenomena. Many papers were published and the work was brought together in an admirable lucidly written volume entitled *Problems of Fertilization*. His

views, embodying the "fertilizin theory," met with criticism at first, but the theory has recently received strong support in the work of others.

While the studies on fertilization were in progress, Lillie entered another field, the relation of internal secretions, particularly sex hormones, to the differentiation of sex. The chromosome theory of sex determination was at that time in the ascendancy and yet something more than sex chromosomes seemed required to account for the complete development of sex characters. Having an abundance of material available at the Chicago stockyards, Lillie attacked the problem by a study of the free-martin, the female member of a heterosexual twin pair in cattle, which is ordinarily sterile and gives evidence of partial sex inversion. He showed that in cattle twins a communication between the placental arteries of the two members of the pair is early established and that the sex-hormone secreting cells of the male are first to function, with the consequence that their secretions inhibit to a degree the development of the female characters. This work gave a new turn to prevalent views and constitutes one of the foundation stones of the present imposing mass of knowledge that has since been built up in this general field.

Lillie's last research interest was the development of the feather. To this he brought the skill in analysis required to resolve the complicated interplay of factors entering into the development of these structures. By means of experiments of unusual elegance and precision he was able to show how hormones and other substances in the circulating blood interact with intrinsic factors in the feather germ, such as the location of growth centers, differential growth rates and thresholds of sensitivity, to produce the definitive feather pattern. In this work he was ably assisted by a number of younger associates. His last paper, the article "Feather" in the *Encyclopedia Britannica*, appeared in 1947.

In all he published about one hundred papers and addresses and four books: besides the two mentioned above, a laboratory guide in embryology and an historical account of the Marine Biological Laboratory. He also took an active part in the establishment and conduct of a number of scientific journals, including the *Biological Bulletin*, of which he was Managing Editor for many years, the *Journal of Experimental Zoology*, the *Quarterly Review of Biology*, and *Physiological Zoology*.

Lillie, as head of a large and active university department, attracted many advanced students who formed a devoted group. Usually he assigned them problems related to those upon which he himself was working, but he encouraged independence and only rarely published jointly. Many of his pupils now occupy positions of importance.

He was a member of numerous scientific societies, in several of which he served as President (American Society of Zoologists, Central Branch, 1905; American Society of Naturalists, 1915; National Academy of Sciences, 1935-1939). Honors came to him from this country and abroad. He was elected to the National Academy in 1915, to the American Philosophical Society in the following year, to the American Academy of Arts and Sciences, the Academy of Natural Sciences of Philadelphia (Correspondent), the Royal Society of Edinburgh (Honorary Fellow), the London Zoological Society (Foreign Member), and a number of other societies here and in Europe. The honorary degree of Sc.D. was conferred upon him by the University of Toronto, Yale, and Harvard and the LL.D. by Johns Hopkins University.

In 1895 Lillie married Miss Frances Crane, whom he had first met at Woods Hole. They brought up a large family, of whom, besides Mrs. Lillie, four daughters, three adopted sons, grandchildren and great-grandchildren are now living. The Lillie home was open house to their wide circle of friends, and those who have enjoyed their hospitality, characterized by its warmth and informality, will never forget its charm. Their generosity was carried into all the affairs of life, though quietly exercised. Notable among their benefactions was the gift of the Whitman Memorial Laboratory to the University of Chicago, which greatly added to its facilities for research in experimental zoology.

As measured by service and tangible accomplishment, Lillie's life was highly successful, but never by the sacrifice of principle for expediency. His steadfast adherence to what he thought to be right served to inspire confidence on the part of his friends and associates. One of them writes, "I have never enjoyed working with anybody as much as I did with Dr. Lillie." What he did accomplish was done quietly and seemingly without effort. His orderly mind, his clear vision, and his sense of fairness all contributed to make this possible. Whatever internal struggles he may have gone through in reaching his decisions, were not made known to his friends, for he never burdened them with his troubles.

Lillie's contributions to embryology and cytology are substantial and distinguished. All added materially to our knowledge; all show finish and high standards of workmanship. His more general papers are thoughtful and stimulating. He would undoubtedly have been able to do more in research, had he not undertaken such exacting administrative duties, but who will say that this would have been better for science? Certainly not those who have been associated with him at the University of Chicago, nor the many who have benefited by the developments at the Marine Biological Laboratory, nor the workers who have shared in the fame of the Oceanographic Institution, nor those who have been helped by him in countless other ways.

The remembrance of his well balanced and unselfish life will remain as an inspiration to all who had the privilege of association with him.

ROSS G. HARRISON

GEORGE GRANT MACCURDY
(1863-1947)

On November 15, 1947, the beloved founder of the American School of Prehistoric Research was killed by a passing car as he stepped from his own near Plainfield, New Jersey, to ask road directions. He and Mrs. MacCurdy were motoring south where they intended to spend the winter.

Dr. MacCurdy was the son of a Georgia planter who disapproved so strongly of slavery that he freed his slaves and was moving to free territory when he was caught by the Civil War at Warrensburg, Missouri. He even served in the State Militia of the Union Army, though fortune spared him the bitterness of fighting his own kinsmen. The forthrightness of the father was repeated in the son.

The Civil War brought poverty to the elder MacCurdy, for his lands were fought over and devastated. George Grant MacCurdy even as a small child worked in the fields, but he had no thought of remaining forever on a farm. He attended the State Normal College at Warrensburg, but he was only able to pay for his education by numerous long interruptions in his studies during which he taught school. When he needed more money for tuition, he would set out on a horse or even on foot, his valise in his hand, to look

for work. His first job was in 1881, and it paid him \$22.50 a month. But he rose with astonishing speed to be a principal, and at twenty-six was a Superintendent of Schools. He must have created a strong impression in those days, for shortly before his death he received a letter from a man whom he had taught for one term sixty years ago. Dr. MacCurdy was justly proud of that letter, and also of the fact that he had such a clear memory of his pupil.

In 1889 George Grant MacCurdy was chosen to be a Y.M.C.A. delegate from Warrensburg Normal College to one of Dwight L. Moody's conferences at Mount Hermon, and his fellow students raised the money for his traveling expenses by giving an entertainment fittingly called "The Spirit of History." On this occasion, the first of his many long travels, he visited Boston, went to Cambridge and looked eagerly at Harvard. Two years later with the help of a scholarship he found himself admitted to Harvard with advanced standing. He devoted himself at that time to geology and biology, though Professor Putnam, then director of the Peabody Museum at Harvard, almost persuaded him to take up anthropology. That decision was to come later. He took his A.B. in 1893 and his M.A. the following year. During the summer of 1894 he was the guest of Alexander Agassiz at his biological laboratory at Newport.

About this time, George Grant MacCurdy became acquainted with Professor Edward E. Salisbury of Yale, whose wife was his distant cousin. The Salisburys were discerning people, and the professor offered to pay the expenses of his young relative's studies abroad. From this grew four years of study at Paris, Vienna, and Berlin and intensive foreign travel that included even Turkey and Russia.

In 1896 Dr. MacCurdy attended the International Zoological Congress in Leyden at which du Bois first exhibited the bones of *Pithecanthropus*. This fired his imagination, and he determined to devote himself exclusively to anthropology and prehistoric archaeology.

These student days in the great continental capitals were a subject which Dr. MacCurdy loved to recall. Vienna was his favorite, and during his year there studying under Hoernes, he spent much time at the home of the Hofrat Kubasek, the legal adviser to the Emperor Franz Joseph. Dr. MacCurdy had many remarkable memories of that association—frequent evenings at the

Opera, luncheon with the Emperor, and the story of Kubasek's sudden departure in the early hours of the morning to go alone with Franz Joseph to Mayerling.

On his return from Europe, Dr. MacCurdy became associated with the Peabody Museum at Yale where he received his Ph.D. in 1905 and where he remained until he became Professor Emeritus in 1931. Under his curatorship the collections of anthropology and prehistoric archæology at the Museum grew enormously and were catalogued with scientific skill. He also continued to travel widely and to keep in close touch with scientific developments abroad. It tickled his fancy that his thirteenth-century ancestors, descended from still more ancient kings of Scotland, bore the name Maquerwerdy, "summer wanderer."

From 1910 to 1912 he spent part of his time in New York cataloging and arranging for exhibition the prehistoric collections from the Old World at the American Museum of Natural History. As a result of this he was offered an appointment on the Department of Anthropology there, but, since he preferred to stay at Yale, he declined.

During his whole career Dr. MacCurdy was a prolific author as the immense list of his published works indicates. It is safe to say that no other scholar outside the Old World has made so many notable contributions to the study of its prehistory. But, though he was chiefly interested in the Old World, he also traveled widely in the New World and wrote authoritatively on American subjects.

Of Dr. MacCurdy's many books, the most celebrated is, of course, his *Human Origins* which appeared in two volumes in 1924. While not the first great manual of prehistory to appear in America—Osborn's *Men of the Old Stone Age* had been published seven years previously—*Human Origins* is of far wider scope. Many new discoveries have, of course, been made in the intervening decades, but *Human Origins* is still an invaluable mine of information about discoveries made up to 1924, and it remains a great monument on the long road that scholarship has traveled in the search for Man's beginnings.

In 1919 Dr. and Mrs. MacCurdy were married, and her enthusiasm, encouragement, and constant companionship on his travels were for him an unfailing source of inspiration.

In 1921 Dr. MacCurdy, with Mrs. MacCurdy and Dr. Charles Peabody, founded the American School of Prehistoric Research.

It was at first called the American School in France for Prehistoric Studies, but interest was later directed to Europe in general and finally to the whole of the Old World. For eight seasons Dr. and Mrs. MacCurdy themselves conducted the summer trip for students to European museums and sites and also carried out excavations, of which the most notable was that at the Abri des Merveilles in the Vézère Valley where the famous Mousterian tools of rock crystal were found. But after that site was finished in 1930, Dr. MacCurdy turned over most of the work abroad to others, though he continued to direct the remarkably successful series of excavations in which the School participated in the Danube Valley and in the Middle East. The most notable of these was the Neanderthaloid necropolis at Mt. Carmel containing the oldest complete skeletons of Man discovered up to that time.

Even after 1930 Dr. MacCurdy continued to travel abroad, and these last trips were like a royal progress at which he attended banquets and receptions, presided at congresses, and replied to addresses of welcome.

Dr. MacCurdy also edited the *Bulletin* of the School until he retired as Director in 1945, and under his editorship many papers of scholarly importance appeared in it.

During later years, cooperation with the Peabody Museum of Harvard became more and more a feature of the School's activities, and that Museum became the repository for the School's collections. This development grew from the strong ties that had always existed between the School and Harvard. Dr. Charles Peabody, one of the cofounders of the School, was Curator of European Archaeology at the Peabody Museum at Harvard, and Professor E. A. Hooton of the Department of Anthropology and Professor Donald Scott, the Director of the Museum, have long been Trustees of the School.

In recent years Dr. and Mrs. MacCurdy were to be found at their beautiful house at Old Lyme, Conn., where they lived among the books, flowers, and birds that they loved. Their life there was by their own choice simple, but their generosity was unbounded toward any who needed their help. In recent years they sent innumerable food parcels to colleagues in Europe, some to old friends, but many others to scholars whom they scarcely knew. George Grant MacCurdy was indeed the kindest of men. He was so truly kind that it actually pained him to believe ill of others, and he was ever ready to help younger people. The group of American scholars

who have contributed in recent years to the prehistory of the Old World have almost without exception been students of what he always referred to as "our School."

Dr. MacCurdy was the recipient of many honors during his long life, only a few of which need be mentioned here. But the one that pleased him most came at the very end when in 1946 he was elected Vice-President of the Archaeological Institute of America. He was also one of the founders of the American Anthropological Association which he served as Secretary from 1903 to 1916 and as President in 1930. He was also a Vice-President of the International Congress of Prehistoric and Protohistoric Sciences and a permanent member of its committee. Elected to the American Philosophical Society in 1925, he took an active part in its meetings and published four articles in its PROCEEDINGS, the last in 1936 entitled "Prehistoric Man in Palestine." When the Academy of Natural Sciences of Philadelphia held its International Symposium on Early Man in 1937, he was a member of the organizing committee and was chosen to edit the volume entitled *Early Man* in which the papers appeared. He was at the same time modest and self-effacing to a degree, and scheming and self-advertisement had no part in his life. But as Mr. Goldthwaite H. Dorr, the Chairman of the School, wrote of him, "He had an extraordinary gift for infecting others with his enthusiasm for his broad approach to prehistory, which so much enlarges and enriches our own conception of the days in which we live and makes us more patient than we otherwise could be with the difficulties of our own times."

If there is any comfort to be found in his loss, it is in the fact that, although in his eighty-fifth year, he was unimpaired physically and mentally until the day he died. Three days before his death, when the writer last saw him, he had just finished raking the leaves from his large garden, and his reminiscences of his long life were as clear and bright as ever. He never grew too old for living.

Though George Grant MacCurdy was in many ways a New Englander at heart, he was of Southern origin, and his scholarship possessed a courtliness and charm that has vanished in our hurried times. He was also a man of culture in the widest sense, devoted to nature, music, and the arts, and never for a moment became the narrow slave of science. He had an amazing capacity for friendship, and for half a century knew every important scholar and

private collector in his field in Europe and could command their unlimited service on behalf of the School for "conferences," as he liked to call lectures, and for guidance to museums, sites, and excavations. Among the host of scholars that he knew and visited abroad were Hoernes, Manouvrier, the de Mortillet, Montelius, Sophus Müller, Obermaier, Breuil, Sir Arthur Keith, the two Evanses, Haekel, Penck, Boule, Salin, Sergi, and many others.

His funeral services were held in the venerable Christ Church on Cambridge Common where he had gone as an undergraduate, and he lies buried in Concord, as his friends thought most fitting, with the Alcotts, Thoreau, Hawthorne, and Emerson.

HUGH HENCKEN

EDWARD LAURENS MARK
(1847-1946)

Edward Laurens Mark was born in Hamlet, Chautauqua County, New York, on May 30, 1847, son of Charles L. and Julia (Pierce) Mark. He died in Cambridge, Massachusetts, December 16, 1946, being then in his hundredth year.

Mark received his bachelor's degree at the University of Michigan in 1871; he served as Instructor in Mathematics 1871-1872, and then for nearly two years (1872-1873) as Assistant Astronomer on the United States Northwest Boundary Survey. His interest in natural history, stimulated by his experience and observations during the survey, and at a time when the influence of the German universities was at its height, led him to study during 1873-1875 in the Zoological Laboratory in the University of Leipzig under Leuckart, where he received his doctorate in 1876. And his thesis, on the anatomy and histology of certain plant lice, illustrates both the thoroughness and attention to detail that characterizes all his later work, and also the unusual mastery of the German language that he had attained in so brief a sojourn.

He was appointed Instructor in Zoology at Harvard in 1877, shortly after his return to the United States; was promoted to Assistant Professor in 1883, became Hersey Professor of Anatomy in 1886 and retired with the title of Professor Emeritus in 1921. He also served the University continuously as Director of the Zoological Laboratory from 1900 until his retirement.

His published papers span the period from 1877 to 1932, the most recent of his original contributions having appeared when he

had already reached the advanced age of eighty-five. The most extensive of his early writings was on the maturation, fecundation, and segmentation of the slug, *Limax*; a work which (we quote from the Introduction to the Mark Memorial Volume) "... introduced into America the new cytological methods. . . . It likewise introduced into zoology a proper fullness and accuracy of citation and a convenient and uniform method of referring from Text to Bibliography. It marked a step forward also in thoroughness and detail, and in the full perception that, even in zoology, as in physics and chemistry, method is hardly less important than matter." His other published investigations extended to the egg membranes of *Lepidosteus*, to the simple eyes of Arthropods, to *Trichina* in Swine, and to Turbellarian Flatworms, while his translations of Hertwig's *Textbook of the Embryology of Man and Mammals*, and of Part I of Korschelt and Heider's *Embryology of Invertebrates* did much to spread the knowledge of these two classic works among American zoologists.

It was, however, chiefly through his influence on his many students, and especially upon his graduate students that he left his strongest impress on American zoology. Perusal of a mathematics notebook preserved since his undergraduate days shows that his life-long insistence on precision and on order was inborn. He demanded of his students a corresponding and salutary devotion to accuracy and thoroughness, not only in their investigations but in the presentation of their results, whether verbal or pictorial, while he equally demanded that they should write good English. His reputation in these respects soon spread among American colleges, and, as a natural consequence, his laboratory was frequented by many students. Concrete proof that his services in this regard were widely appreciated is to be seen in the Mark Anniversary Volume published in 1903 to commemorate "Twenty-five Years of Successful Work for the Advancement of Zoology" by his present and former students, the names of 140 of whom appear on the introductory pages. And his influence had spread over a field so broad that the twenty-five contributions were on the cytology, embryology, and later development, habits, heredity, general morphology, reactions, taxonomy, and variation of animal groups as diverse as coelenterates, flatworms, annelids, molluscs, crustacea, insects, acidians, fishes, birds, and mammals. During his services as Director of the Laboratory of Zoology at Harvard, he acted as editor for about 350 papers appearing as contributions from the Laboratory.

Dr. Mark is also widely known for his association with the Bermuda Biological Station for Research, of which he was perhaps the leading spirit from its organization in 1903 until he paid it his last yearly visit at the age of ninety-two. Associated first in the project with the late Professor C. L. Bristol, it was largely owing to his efforts that initial funds were raised, for the equipment of the Station and for its continuing operation. And it became his chief interest and diversion following his retirement at Harvard. During his twenty-eight years as its Director, Dr. Mark was chiefly responsible for the managing and financing of the Station. He continued as Trustee and Chairman of the Library Committee until the time of his death. During this period of over forty years he saw the Station grow from the small establishments at Flatts Inlet and Agars Island to the much larger and well-equipped laboratory now operating at St. Georges. The published contributions from the Laboratory numbered 170 before his retirement. And the high regard in which he was held by the population and by the Government officials of Bermuda contributed greatly to the welfare of the Station.

It was through the careful management of the affairs of the Bermuda Station that Dr. Mark made his chief contribution to science in the later years of his life. Though reluctant to delegate the smallest detail to anyone else, he nevertheless found time in the evenings, over a period of many summers to observe the interesting behavior of Bermuda "fire-worms" and to keep careful notes on their appearance in relation to the phases of the moon. It is certain that he intended these observations to be published as his last scientific contribution since he had prepared an outline, had abstracted the literature on lunar periodicities, and had even penciled a carefully worded dedication. This material was found among his effects and from it an article is in preparation. Many evenings one would find him at the jetty, watch in hand, ready to record the exact minute that the first fireworm was to be seen glowing in the surface waters of the Reach.

As an instance of his vitality, even at this advanced age, those who were with him at the Station in 1939 recall that, wishing to get a letter in the mails in time to make the next ship out of Bermuda, he walked to St. Georges and back, a distance of three miles, in the hour before lunch on a hot July day.

In recognition of his long and faithful service in the interests

of the Bermuda Station, the library there has been named the Edward Laurens Mark Memorial Library.

Distinctions received by Dr. Mark include the honorary degree of LL.D. from the Universities of Michigan in 1896 and of Wisconsin in 1904; also election to the American Philosophical Society in 1907, to the National Academy of Sciences, to the American Academy of Arts and Sciences, to the Society for Biological Chemistry of London, to the Anatomische und Zoologische Gesellschaften, to the Société Royale Zoologique et Malacologique Belgique. He was also an honorary member of the Institut Internationale d'Embryologie (Holland) and of the Sociedad Cubana de Historia Natural "Felipe Poey," a corresponding member of the Peking Society of Natural History, and a foreign member of the Koeniglich Boehmische Gesellschaft der Wissenschaften, and held membership in many other scientific societies of this country.

His many years of family life with Lucy Thorp King, whom he married in 1873, were happy ones until her death in 1923. He is survived by their two children, Kenneth Lamartine Mark, now Professor of Chemistry, Emeritus, Simmons College, and Fredrica, now Mrs. George H. Chase of Cambridge, Massachusetts.

HENRY B. BIGELOW
J. H. WELSH

JOHN BASSETT MOORE
(1860-1947)

John Bassett Moore was representative of that breadth of interest and background which is appropriate to membership in the American Philosophical Society. True, Moore lacked training in and special knowledge of the physical sciences but his interests were catholic. His mind was not strikingly original but it was constructive and well stored. His style in writing was sententious, weighted with illusions, revealing the long remembered inspiration of Thomas Randolph Price who taught him Greek and through Greek, English. When Judge Moore died on November 12, 1947, no American authority would deny that the world had lost one of the foremost international lawyers of modern times. He was also known and honored internationally with honorary degrees, decorations, and memberships in organizations in Europe, the Americas, and China. He left a strong imprint on the tradition of interna-

tional adjudication and on the jurisprudence of the Permanent Court of International Justice of which he was a judge from 1921 to 1928. He left an indelible impression upon generations of students of all nationalities who attended his classes between 1891 and 1924 when he was Hamilton Fish Professor of International Law at Columbia University. Yet in the European tradition he is not usually included among the great figures who have developed international law. Probably this may be attributed to the fact that, although he was a prolific writer, he never wrote a general systematic treatise on international law. His views are not on display in any one literary showcase. He is best known for his digests—six volumes on arbitrations published in 1896, eight on international law in 1906, and seven more of “international adjudications” from 1929 to 1936. To the casual observer these works may suggest the mere compiler, the “index hunter who holds the eel of science by the tail.” Such an observation would testify only to the superficiality of the observer. Judge Moore was not diffident or shy but many of his wise and pungent analyses and comments on the law of nations are buried among the documentary extracts in his great *Digest of International Law*. His fugitive writings in a great number of scholarly, professional, and popular journals are now available in the seven volumes of his *Collected Works* published in 1944 but such publication gives only the raw material for an appreciation of his scholarship.

He was of course a leading positivist. He was a prominent actor in statecraft; a successful practitioner of law. He had a philosophic, speculative, and systematic mind but he did not devote his talents to purely theoretical analysis. Throughout many of his writings he reveals that not unusual tendency of the American international lawyer to defend his subject from the valorous ignorance of his brethren at the bar. He was concerned to demonstrate the reality of international law in international life. When he testified that “international law is on the whole as well observed as municipal law” he spoke as an expert witness who knew whereof he spoke. He wrote also as an historian and was proud of his mastery of historical detail.

He was inclined to be intolerant of ignorance in high places. There is a leashed fury in some of his addresses and writings of the last twenty-five years wherein he took to task statesmen, professors, and publicists who seemed to him to ignore the lessons of history.

Here his keen but sardonic humor was devastatingly employed. His mastery of precedent and his devotion to it seemed to make him inelastic and even unappreciative of the consequence of changes which contemporaneous precedents were introducing in international life. His attitude toward evolving practices in the recognition of governments is a clear example. He wrote wisely and prophetically about international organization but he was scornful of the League of Nations and its advocates. He personified the dilemma of the positivist who in his convinced devotion to international law concentrates upon that which has been established by custom, to the frequent detriment of desirable change. Yet in a new field like that of aerial warfare he did render yeoman service as chairman of the committee of jurists appointed under a resolution of the Washington Conference on the Limitation of Armaments in 1922. To those governments and individuals who sought to serve momentary interests by throwing off legal shackles, he was a Cerberus who bit savagely into lack of logic and distortion of history. The titular essay in his volume entitled "International Law and Some Current Illusions" is a prime example of this quality.

The scholarship displayed in his last great work *International Adjudications* may be considered by some to be meticulous, but he felt the need for setting a standard, much as did David Hunter Miller in his masterly edition of the treaties of the United States.

Judge Moore described himself as largely self-taught. Elementary schooling in his native state of Delaware where he was born on December 3, 1860, followed by three years at the University of Virginia were the only preludes to learning law in a law office according to the custom of the day, followed by appointment as Third Assistant Secretary of State while he was only twenty-six years old. At the age of thirty-one, without previous teaching experience, he was called to the professorship at Columbia by Burgess. Here he followed in the footsteps of Chancellor Kent and Francis Lieber and was a colleague of Goodnow, Munroe Smith, Seligman, and Osgood. He retained his post at Columbia until 1924 when he resigned because of the pressure of his duties as a judge of the World Court. During the thirty-three years of his professorship he was frequently called to public service. As Assistant Secretary of State under McKinley and as Counsellor of the State Department under Wilson he functioned on occasion as Secre-

tary of State. Intermittently he rendered advice to the government and to private clients. Academic and other honors naturally were bestowed upon him. He was elected a member of the American Philosophical Society in 1907 and his contributions are to be found in Volumes 51 and 55 of the PROCEEDINGS.

Some there are who may remember him for his barbed shafts which he shot so well. Those who knew him more intimately recall his generosity, hospitality, and kindness, his skill as raconteur. It was part of his gift as a teacher and of his service as a public figure that he was equally patient with the young aspiring student and impatient with the older men who had forgotten, as he himself never forgot, that the pursuit of learning ends only with life itself.

PHILIP C. JESSUP

WILLIAM PEPPER

(1874-1947)

If the ghost of Benjamin Franklin takes cognizance of earthly happenings it must have been pleased with the subject of this memoir. William Pepper was a direct descendant of Benjamin Franklin's daughter, Sarah, and her husband, Richard Bache. He was elected a member of the American Philosophical Society in 1937 and for many years was a very active officer of the University of Pennsylvania, the direct descendant of the College of Philadelphia which was founded by Franklin. Another chief interest in Dr. Pepper's life which would have greatly pleased his great ancestor was the Free Library of Philadelphia which owes its foundation to his father and of the Board of which the son was for many years president.

William Pepper was born in Philadelphia, May 14, 1874, the son of Dr. William Pepper, for many years provost of the University of Pennsylvania, and his wife, Frances Sergeant (Perry) Pepper. After graduating from the Arts Department of the University of Pennsylvania in 1894 he graduated from the Medical Department in 1897 and, after serving an internship at the Philadelphia General Hospital, at once began his long association with his Alma Mater. In passing we might note that his diploma as M.D. from the Medical Department of the University was signed by his father, who was then Provost and Professor of Medicine in the University, whose own diploma had been signed by *his* father

who at that time held the chair of medicine, and that the subject of this sketch as Dean of the Medical Department signed the diploma of his son, Dr. D. Sergeant Pepper.

His first teaching appointment at the University of Pennsylvania was Assistant Instructor in Clinical Medicine in 1899. He was promoted to Instructor in 1903 and served in that capacity until in 1907 he was appointed Assistant Professor of Clinical Pathology in which capacity he taught until 1919. His most important service to the University was rendered as Dean of the Medical School, a position which he held from 1912 until his resignation in 1945, when his long years of hard work and fine service were recognized by his appointment as Dean Emeritus. No man could have possessed to a greater extent the qualities necessary to meet the demands of the Dean's office. His natural kindly disposition was mingled with great firmness, a wonderful insight into human character, and a keen sense of justice. These characteristics caused him to be admired and loved by both the faculty and students.

It is interesting to note that for seven years after assuming the duties of Dean, Dr. Pepper continued his work as Assistant Professor of Clinical Pathology, a subject in which he never lost interest. In this he was following closely in the footsteps of his father who not only had founded the Pepper Clinical Laboratory at the University of Pennsylvania but in his writings and lectures emphasized its importance. In 1869 in conjunction with Dr. Thomas G. Morton his father had compiled the descriptive catalogue of the Museum of the Pennsylvania Hospital, a unique work in its day which won deserved appreciation. The bibliography of his published papers illustrates his interest in clinical pathology and in medical education. During the latter years of his life Dr. Pepper was elected a Trustee of the University and his interest in it thus continued until his death.

Dr. Pepper's great interest in the Free Library of Philadelphia might also be attributed to inheritance from his father who had been chiefly interested in its founding, and to his uncle George S. Pepper who left a large sum of money for its endowment. He was elected to the Board of Trustees in 1906, and in 1907 also to the Board of Directors. In 1916 he was elected Secretary. From 1939 to 1943 he was President of the Trustees and from 1924 until his death President of the Board of Directors. During these years he

was very active on some of the most important committees. He was a splendid presiding officer and his familiarity with every detail of the work of the Free Library and its many branches was astonishing.

Dr. Pepper was an ardent naturalist. At his small place in Melrose Park he banded hundreds of birds every year and was keenly interested when he received news of their arrival in southern climates. At suitable seasons it was seldom that he did not carry in a pocket some flexible numbered metal bands and some parchment labels addressed to the Smithsonian Institute. He was likewise a great fisherman. Every spring at the opening of the trout season Dr. Pepper would hie to his fishing club in the Poconos. He contributed many short notes or articles on subjects connected with natural history to periodicals devoted to them. At one time he lived in a house at Newtown Square. I read an article in which the author referred to shrews, stating that he had frequently observed them in the neighborhood near Jenkintown. As I had passed many summers in the country near Philadelphia and had never seen a shrew I asked Dr. Pepper if he had ever encountered the animal. He said that he frequently had and that among a huge number of bones which he had gathered from beneath an owl's nesting-place in a dead chestnut tree at Newtown Square he had gathered together enough bones of dead shrews to show that at least six had been killed by the owls which inhabited the tree.

Another of his interests was the history of medicine on which he contributed many articles to periodical literature. One particularly valuable article of this kind entitled "The Medical Side of Benjamin Franklin" was republished as a book in 1911.

Dr. Pepper was commissioned a first lieutenant in the Medical Reserve Corps of the United States army in 1908. On April 26, 1917, he was summoned to active duty and promoted to be a major. In June of that year he was stationed at the Medical Officers' Training Camp, Fort Oglethorpe, Georgia. He was commissioned lieutenant colonel November 6, 1918, and promoted to colonel February 24, 1919. He was honorably discharged December 21, 1919. During a large part of his time in the service he was commanding officer of Base Hospital 74.

In addition to the American Philosophical Society, Dr. Pepper belonged to many other scientific organizations; the College of Physicians of Philadelphia, the Association of American Medical

Colleges of which he was president in 1920–1921, the Pathological Society of Philadelphia, the American Medical Association, etc.

In 1932 Dr. Pepper received the honorary degree of Sc.D. from the University of Pennsylvania and received later the honorary degree of LL.D. from Temple University in 1942.

Dr. Pepper was married twice—(1) in 1904 to Mary Godfrey who died in 1918; (2) to Phoebe S. (Voorhees) Drayton who died in 1944. By his first wife he had three children: Mrs. Mary Pepper Parker, D. Sergeant Pepper, who became a physician, and William Pepper, Jr., who is assistant librarian in the Free Library of Philadelphia.

He is also survived by his brother, Dr. Oliver H. Perry Pepper, who has been Professor of Medicine in the University of Pennsylvania, being the fourth Pepper to render notable service to the University of Pennsylvania.

Dr. Pepper attended the meeting of the Wistar Association at the Hall of the American Philosophical Society last November at which he seemed to be in good health and spirits. A few days later he was taken ill and removed to the University Hospital where he had labored so long and faithfully. He died of cardiac thrombosis December 3, 1947. Few men left a larger circle of friends and admirers. He had what our ancestors used to call “a gentle wit,” always kindly, never malicious, and his natural modesty and kindness were associated with great intellectuality and firmness of character and straight-forwardness, invaluable characteristics in the work in which he was chiefly active during his life.

FRANCIS R. PACKARD

MAX PLANCK

(1858–1947)

Max Planck died in Göttingen on October 4, 1947, shortly before his ninetieth birthday. By virtue of his introduction of the quantum hypothesis, he was the spiritual father of the modern development of physics and of the basic concepts of many other sciences and of their epistemological interpretations.

Max Planck was born at Kiel in north Germany on April 23, 1858, the son of Wilhelm Planck, a noted jurist like many of his forebears. The family came originally from Schwaben in south Germany. It was still farther to the south, in Munich in Bavaria,

that Planck lived during the formative period of his youth. There he went to high school and later studied physics at the University of Munich. Life in that colorful town with its vigorous tradition in the liberal arts and the humanities greatly influenced his development during adolescence. After graduating from high school, he wavered between three fields to which he might devote his life; the humanities, music, and physics. The idea of becoming a musician was given up by Planck because he decided that his talent was not great enough; still he was an excellent pianist and often conducted instrumental and vocal concerts in his home with the utmost finesse and deep musical understanding. He decided to become a theoretical physicist. Although keenly interested in the results of experiments he left the *ars experimentandi* to others. From the very beginning of his academic career he confined himself to the interpretation rather than the performance of experiments in spite of the fact that theoretical physics as a separate discipline was at that time non-existent in Germany. Decisive for his final choice was the great inspiration he received from the fact that observations in the physical world can be ordered into a logical system. Such laws as the principle of the conservation of energy affected young Planck with the force of a revelation. It is thus understandable that Planck should have devoted his whole life to studies of the basic laws of nature.

His teachers in physics and mathematics in Munich (1875–1877) did not inspire him, but they gave him many facts and interrelations of facts which served as material for Planck's own thoughts and associations. Even a year in Berlin (1878) where Helmholtz and Kirchhoff taught did not release Planck from his mental isolation. Helmholtz, whose printed lectures are classics of clarity and beauty of language, must have been a terrible lecturer. He spoke in an inaudible voice, wrote in miniature letters on the blackboard, was unprepared, and often forgot his audience entirely. Kirchhoff on the other hand, as Planck mentions in his scientific memoirs, gave well worked-out lectures, but presented them like a memorized script, coldly and impersonally. Planck was, therefore, forced to base his scientific education on the reading of original literature. He was especially attracted by the writings of Rudolf Clausius on thermodynamics, in which this author once and for all disposed of the idea that heat was something analogous to matter. Planck chose for the topic of his doctoral dissertation a thermodynamic subject.

He received his degree in Munich in June 1879. There followed several thermodynamic papers centering around the concept of entropy, a concept originally introduced by Boltzmann but not used by him for problems of thermodynamics proper. These papers did not arouse any interest among the physicists and chemists, just as was the case with very similar papers written (prior to Planck's) by Willard Gibbs in this country but unknown to Planck. When Planck became acquainted with these publications of Gibbs, he acknowledged their priority and more general treatment. These papers of Planck's opened the way to an academic career. In 1880 he became Privatdocent in Munich but not without clear hints from the famous organic chemist, von Bayer, that Planck's chosen field was a sterile and useless one. Five years later he was elected Associate Professor of Physics at the university in his native town of Kiel. Lack of other suitable candidates apparently played a great role in this relatively quick promotion. Planck indicates modestly in his scientific memoirs that the fact that his father was a close friend of the Chairman of the Physics Department in Kiel may have had some influence. Planck's publications during his professorship at Kiel include a book, *Ueber das Wesen der Energie* (*About the Nature of Energy*) which received a prize from the academy in Göttingen; and papers on the increase of entropy in the course of chemical reactions. These papers provoked some controversies with Arrhenius and later with Ostwald. Of course, Planck was right but it took some time before it was acknowledged. The great turning point in Planck's career came when he received a call to the University of Berlin in 1889 to be Associate Professor. He was promoted to a full professorship in 1892. In Berlin Planck finally found congenial surroundings which, according to his own opinion, did more for the broadening of his total scientific understanding than all his previous studies had done. Helmholtz, of course, made the greatest impression upon Planck. According to his contemporaries, Helmholtz was not only a great scientist whose clarity of mind and penetrating powers of judgment everyone admired; he was also a human being with a charming personality. However, his human greatness revealed itself only to the few who, like Planck, gained his respect and confidence. For his relations with the hoi poloi, Helmholtz wrapped himself in the robe of dignity becoming to his position as "Wirklicher Geheimer Rat." When Helmholtz became President of the Physikalisch Technische Reichsanstalt, which had

just been founded, Kundt became director of the physical institute. His personality and vivid scientific mind attracted Planck very much. The friendship with Heinrich Rubens also started during these years.

After surveying the field of thermodynamics in a book which remained practically unchanged through nine editions and still serves as one of the principal textbooks of this field in German universities, Planck's interest shifted to the thermodynamics of temperature radiation. It was not just chance that at that time temperature radiation attracted the minds of the very best physicists everywhere. It is rather one of the most interesting examples proving that pure science is not only the instigator of technological development but often is stimulated by technical progress to solve its most basic questions. Just as the great school of thermodynamics in England originated under the influence of Watt's invention of the steam engine, the pioneer work on temperature radiation can be traced to the inventions which improved the illumination of our houses. This is as true for the pioneer theoretical work of man like Kirchhoff, Rayleigh, Jeans, Boltzmann, Wien, and Planck as for the experimental work of Rubens, Lummer, Pringsheim, and others. The experiments of the last mentioned group started in the Physikalisch Technische Reichsanstalt as an attempt to use the black-body radiation for the construction of standards for measurements of illumination intensities.

What was the situation? When the experimentally determined energy of the temperature emission of a black body was plotted against wavelength, a curve was obtained with a maximum which shifted toward shorter wavelengths with rising temperature. At infinitely short wavelengths the intensity went down to zero and was again low in the region of very long wavelengths. Jeans and Rayleigh, who derived a radiation formula on the basis of the law of equipartition of energy between all degrees of freedom, expected an energy distribution curve of an entirely different character. Their curve is only in agreement with observation in the long wavelength region but has no maximum and deviates grossly in the region of short wavelengths. As a matter of fact, the theory predicted a continuous rise to infinity with declining wavelength. Many attempts had been made in vain by the best scientists to overcome this difficulty. W. Wien derived a radiation formula which gave the maximum and was in accordance with observations in the

short wavelength region. Very careful measurements by Rubens and Pringsheim proved, however, that Wien's law failed to agree with observations in the long wavelength region. Rubens kept Planck continuously informed about the outcome of the experiments. Planck developed an empirical formula which for long wavelengths coincided with that of Rayleigh-Jeans curve, and for short wavelengths with Wien's formula. He sent it by postcard to Rubens, and it turned out to fit all observations perfectly. Planck realized that the classical thermodynamics, so very familiar to him, inevitably led to the Rayleigh-Jeans radiation law. Something was apparently fundamentally wrong with the laws of classical physics. One can imagine that the situation became a great challenge to Planck. He worked for months, as he admitted later, more intensively than he had ever worked before or ever would again. His goal was to find out what changes in the assumptions had to be introduced to get a sound derivation of his empirical formula. To his utter astonishment, he found that the theory of the equipartition of energy had to be sacrificed, and replaced by the revolutionary assumption that light was emitted and absorbed in energy units—quanta—whose size was proportional to the fundamental constant h and to the frequency of the light. He presented this result in a paper read at a meeting of the Berliner Physikalische Gesellschaft on December 14, 1900. That was the natal hour of the quantum theory which, in the course of its development, penetrated and changed concepts in practically every field of physics and chemistry, and is still conquering more and more territory in all sciences. It is difficult to say whether the joy of the discoverer prevailed in Planck or the regret that the classical approach to physics, so cherished by him, had failed dismally. He was by his very nature a classicist and by no means a romantic revolutionary. In his derivation of the radiation formula he conserved as much as possible of the classical concept. This very fact introduced a kind of discordance into Planck's theory. Later (1916) Einstein gave a new derivation of Planck's formula which is now generally accepted. Einstein had no hesitation in going the whole way and removing every part of the classical theory not organically connected with the concept of the quantum theory. Planck, on the contrary, for years made every attempt to reconcile his formula as much as possible with the classical concept. For instance, he was pleased to find that his radiation equation can

be derived by introducing the quantum hypothesis for light emission only and not for the absorption process. He did that like a man who, forced by irresistible circumstances to burn the bridges behind him, still casts longing glances toward the territory beyond the river. The writer still remembers vividly a talk which Planck gave at the colloquium in Berlin when the quantum theory was only a few years old (probably 1903). He spoke of some of his attempts to avoid if possible the quantum hypothesis. His conclusions, however, were the following: There is no way out—we have to become accustomed to the quantum theory, and we shall see that it will penetrate into more and more fields of our physics. He was more right than he himself could have anticipated. He could not foresee that our whole concept of the structure of matter would be based on the quantum theory; neither could he have had any presentiment of the future development of quantum mechanics, quantum electrodynamics, etc., which may still have the greatest surprises in store for the physicists.

Planck, who revolutionized science because he had to, became a kind of godfather to the second great revolution which shook the foundation of our science during his lifetime—Einstein's theory of relativity. He was one of the very first advocates of Einstein's ideas and it was he who was responsible for Einstein's coming to Berlin to take a position at the Academy in Berlin and at the Kaiser Wilhelm Institut. Planck was fascinated by Einstein's theory in all its phases and understood its implications much earlier than most of his contemporaries.

According to his own statement Planck was especially attracted to the theory of relativity by its content of absolutivity, meaning the unique position ascribed to the velocity of light. But that remark of Planck's was certainly not meant to be a sufficient explanation of his special interest in the theory of relativity. Revolutionary as it is, in its introduction of entirely new concepts of space and time and in the unrelenting strictness with which statements sanctified by tradition were recognized as meaningless and cast away—still the theory of relativity is the keystone, missing for centuries, which perfected the structure of classical physics. That, the writer believes, is the real reason for Planck's strong affection for Einstein's work.

For forty years Planck remained Professor of Theoretical Physics in Berlin. Generations of physicists followed his lecture courses

with enthusiasm because of the clearness and perfection of what he said, and with admiration for the personality of the man who said it.

With advancing age more and more burdens of an administrative nature were heaped on Planck. He felt the obligation to use his reputation for the benefit of science as a whole. He was one of the founders of the Berliner Physikalische Gesellschaft and was most active in the creation of the German Physical Society. He regularly attended the colloquium at the university, and was to a great extent responsible for the fact that it was for many years unique not only in the composition of its audience but in the excellence of the presentations and the breadth of the subjects discussed.

His duties as Permanent Secretary of the Berliner Academie took another part of his time. In addition Planck later accepted the presidentship of the Kaiser Wilhelm Gesellschaft. The question arises whether Planck was a good administrator, and the answer depends upon the point of view. If to be a good administrator means to inspire in colleagues and subordinates the utmost confidence in the integrity and justness of their superior, then Planck was undoubtedly a good administrator. His opinions and judgment were often sought in cases not connected with his official duties.

Planck was still President of the Kaiser Wilhelm Gesellschaft when Hitler rose to power. There were friends and admirers of Planck who hoped that in the name of science, he would raise his voice in open protest against that kind of government and what it stood for. But that did not correspond with his character. The family tradition that the law is sacrosanct was too strong in him. He hated Hitler's laws, but they were the Law and therefore must be obeyed so long as they were in force. However, Planck thought that one could try to influence Hitler to persuade him to mend his evil ways. So Planck asked for an interview with Hitler. He was courageous enough to say to the almighty dictator what he felt he had to say. He got his interview, but it was doomed to failure. As soon as Hitler found out what Planck wanted, he started a philippic lasting for hours which, if not as convincing as Cicero's, at least was delivered with equal power of voice. Planck did not resign from his position. He regarded it as his duty to save what he could of German science during the evil times of the Hitler regime, which he hoped and believed would be only of short duration. The Nazis

used Planck's name to further their own designs by printing a telegram of adulation supposedly sent to Hitler by Planck as President of the Gesellschaft Deutscher Naturforscher und Ärzte. With the newspapers completely under government control, it was impossible for Planck to have a denial printed.

The writer last saw Planck in 1935 on the occasion of a very brief trip from Denmark to Berlin. Planck was extremely unhappy. He responded to the proposal of a visit to Denmark to breathe the air of freedom for a few days in a manner typical of his thinking. He said, "No, I cannot travel abroad. On my previous travels I felt myself to be a representative of German science and was proud of it—now I would have to hide my face in shame." Still, at that time, Planck did not imagine the total depths of depravity, insanity, and sadism into which Hitler was to lead Germany. He lived to experience it, well informed of what was happening by his second son, Erwin Planck. (His oldest son was killed in action during the First World War.) Erwin Planck, Secretary of State under Schleicher, was a man of the highest courage and integrity and an active foe of the Hitler regime. He later was involved in the unsuccessful plot against Hitler's life, and in 1945 suffered a terrible death at the hands of the Gestapo.

When Hitler plunged the world into total war, Planck shared the fate of millions of his countrymen. His beautiful home in Grunewald near Berlin, including his library and all of his personal belongings, was destroyed by bombs. He had to leave Berlin and was trapped for hours in an air-raid shelter in Kassel, which had caved in from a hit. Temporarily he found a home with friends on a big farm near Magdeburg. When the war swept over that area he and his wife were left shelterless. Finally he was rescued by some American colleagues, members of a scientific mission to Germany, who found Planck bent in pain from arthritis, and transported him to a hospital in Göttingen. Planck's remarkable vitality overcame many of these spiritual and physical sufferings. It was the execution of his beloved son, Erwin, which finally destroyed his will to live. Although his health improved under the care of his wife, in Göttingen where they now lived in the house of a niece, he was a broken man whose world was shattered. During periods of better health he still felt it his duty to accept invitations for lectures. He used some of his older manuscripts on the relations between science and philosophy which he read to his audience.

Death came to him as a redemption. So the life of one of the greatest scientists, upon whom the world had bestowed its highest scientific honors, ended in grief and misery.

May his memory live on in us; he was a great scientist and man of integrity and justice!

JAMES FRANCK

MAZŸCK PORCHER RAVENEL
(1862-1946)

Of Huguenot ancestry and a distinguished South Carolina family, Dr. MazŸck P. Ravenel was educated at the University of his native state and at the Medical College of South Carolina where he obtained his medical degree in 1884. He was one of the last survivors of the group of men who knew Pasteur and Koch, brought bacteriology to this country and developed it as a science and as a tool in the diagnosis and prevention of human and animal diseases.

Following his graduation from medical school, Dr. Ravenel studied at the University of Pennsylvania and then went to Europe where he worked at the Pasteur Institute and in Halle and Genoa. On his return he practiced medicine in Charleston, South Carolina and served as a member of the faculty of the Medical College for six years. He was appointed the first director of the Hygienic Laboratory of the New Jersey State Department of Health in 1895. The following year he was made bacteriologist for the Pennsylvania State Live Stock Sanitary Board and Chief of the Laboratory of Phipps Institute in Philadelphia. The ten years during which Dr. Ravenel held these posts were his most productive. One half of 114 scientific papers and other writings were published during this period. Rabies and tuberculosis received particular attention. In 1902 he demonstrated that bovine tuberculosis could be transmitted to man and held his position intact against Koch in a now famous debate at the Sixth International Congress on Tuberculosis in Washington in 1908. This disease was a life-time interest. The last item in his bibliography is a paper on bovine tuberculosis.

In 1907 Dr. Ravenel was made Professor of Bacteriology at the University of Wisconsin and in 1914 he went to the University of Missouri as Professor of Preventive Medicine and Medical Bacteriology and Director of the Public Health Laboratory. This position was held until retirement in 1936. He died at Columbia, Missouri, on January 14, 1946.

No man of his generation served more effectively the cause of public health in this country and the professional society of public health workers, the American Public Health Association, of which he was the President in 1920. These services were rendered in Dr. Ravenel's inimitable manner and often against an opposition that did not understand, far less appreciate, the straightforward, at times perhaps too abrupt, method that was characteristic of the man. It was this same direct honesty that endeared him to those who knew him well. The present series of the *American Journal of Public Health* started in 1911. For ten years it developed slowly under the direction of various editors and editorial committees but those entrusted with publication did not have the time to give to make the *Journal* outstanding. In 1924 Dr. Ravenel was appointed Editor and for seventeen years he was the leading spirit in transforming this journal into a public health periodical that is read throughout the world. The Editor read and criticised every contribution. His wide knowledge of medical and public health literature and his prodigious memory sometimes gave him the advantage over an unwary author who had overlooked the work of a previous investigator. At the same time Dr. Ravenel made use of his editorial colleagues in the evaluation of manuscripts and who themselves learned much from him of the art of writing and of criticism.

In addition to tuberculosis and rabies, Dr. Ravenel's publications included work on anthrax and glanders, on diphtheria, on milk—particularly that phase dealing with pasteurization—and many papers dealing with the various aspects of public health. He was a member of the committee of the American Public Health Association that produced the second and third editions of *Standard Methods for the Examination of Milk*. He was editor of the jubilee volume of the American Public Health Association entitled *A Half Century of Public Health* (1921) and this will remain as an important historical document of the early rise of the public health movement in the United States and as a monument to its editor.

An accomplished host, those who were privileged to visit in Dr. Ravenel's home will not soon forget his delightful southern hospitality and his sincere interest in the development of the younger men who came under his influence either as students or associates in the field of public health which was his principal interest throughout a long and active life.

JOHN F. NORTON

LEO STANTON ROWE

(1871-1946)

From September 1, 1920 until his death by accident on December 5, 1946 Leo Stanton Rowe was Director-General of the Pan American Union. In 1917 he had left his professorship at the University of Pennsylvania to become Assistant Secretary of the Treasury of the United States and in 1919 Chief of the Latin American Division of the State Department. He had been a member of the American Philosophical Society since 1911.

There are few public officials whose services were more widely acclaimed than those of Dr. Rowe and whose passing was followed by so many and such enthusiastic expressions of appreciation of the man. On February 5, 1947 a commemorative ceremony in tribute to his memory was held in the Hall of the Americas. Among those present to do him honor was the President of the United States. His official acts and statements were of course duly recorded but the outstanding feature of the tributes to him is their emphasis on his human qualities.

His associates at the University of Pennsylvania where he was a teacher of Political Science from 1895 to 1917 had for years been staunch supporters and admirers. He was for years Chairman of his department and among his many collateral activities he was for nearly thirty years, until 1930, the President of the American Academy of Political and Social Science, although after 1917 he directed its work from Washington.

Dr. Rowe was born in Iowa, but was educated in Philadelphia, receiving in 1892 the degree of Doctor of Philosophy from the University of Halle, Germany. In subsequent years he was the recipient of fifteen honorary degrees and twenty-six decorations and medals. In addition he was a member of seventy-three professional and scientific organizations, many of them honorary. A selected bibliography of his writings in English and in Spanish is an impressive evidence of his breadth of interest and of his scholarship.

Yet these professional and administrative attainments have not been the matters stressed since his death. At the commemorative exercises in February 1947 the distinguished speakers without exception emphasized his personal characteristics—his friendliness, his devotion to the tasks before him, his frankness, and his simplic-

ity. Though his interests were wide and varied, most of his efforts were given to the promotion of good will among the American Republics. His position as Director-General of the Pan American Union was by its nature one that placed heavy demands upon his time and strength but of even greater importance called for constant tact and the highest type of diplomatic ability.

The death of an outstanding citizen always brings expressions of condolence. Often these are perfunctory, but the messages which poured into the Pan American Union upon the death of Dr. Rowe were very different. Through them there is evidenced the admiration and affection with which he was regarded. Not his administrative accomplishments but his idealism, his devotion, his sympathy, and his understanding were listed as the qualities for which he is remembered.

ERNEST MINOR PATTERSON

WILLIAM BERRYMAN SCOTT

(1858-1947)

The death of William Berryman Scott on 29 March 1947 deprived the American Philosophical Society of one of its most eminent and faithful members and the science of vertebrate paleontology of one of its leading figures and a link with its heroic past.

Scott was born on 12 February 1858, the son of the Rev. William McKendree and Mary Elizabeth (Hodge) Scott. His ancestry and his own life were so closely associated with Philadelphia and Princeton that it is almost difficult to believe that his birthplace was Cincinnati, Ohio. Baches, Wistars, and Hodges, names so familiar in the history of Philadelphia, were among his ancestors and he was a great-great-great-grandson of Benjamin Franklin. His maternal grandfather, Charles Hodge, was a professor in Princeton Theological Seminary for fifty-six years and when Scott's father died in 1861, the bereaved family moved back to Princeton. Part of his earliest education was in Philadelphia, but Princeton was his home for much the greatest part of his long life. There he spent his undergraduate years and took his first year of graduate work and there in 1880 he joined the Princeton University faculty, on which he served actively for just half a century. Scott was wont to remark, rather plaintively, that he had never been offered a position at any other university. The reason seems

obvious: no one could ever imagine him elsewhere than at Princeton.

The story of how Scott and his classmate, colleague, and lifelong friend, Henry Fairfield Osborn, came to take up paleontology as their careers has often been told but cannot be omitted from this account of his life. It may here be given mainly in his own words. With Osborn and Francis Speir, Jr., he was idling one June day in 1876. "After bathing and dressing, we lay on the canal bank and tried to read Paley, but it was too hot to do real work and we began to talk. I said: 'Fellows! I have just been reading in an old Harper's an account of a Yale expedition to the Far West in search of fossils; why can't we get up something like that?' I hardly meant my question seriously, but Speir and Osborn took to the suggestion at once and, with one voice exclaimed: 'We can, let's do it.' " (There is hidden irony here, for this passage reveals that Scott's choice of a profession was inspired by O. C. Marsh, who led the Yale expedition referred to, but of whom Scott later said, "I came nearer to hating him than any other human being that I have known and his hostility to me had a really detrimental effect on my career.")

The boyish plan materialized, and in 1877 and again in 1878 the three friends collected fossil mammals in the Bridger Basin of Wyoming. Scott's first research, jointly with Osborn and Speir, was the description of their collection of 1877. In this study they were helped by E. D. Cope, who was Scott's predecessor as the Nestor of paleontology in the American Philosophical Society and who, in strong contrast with Marsh, was fervently admired by Scott.

Scott's formal education was completed by two years in Europe where he studied with, among others, Huxley in London, Balfour in Cambridge, and Gegenbaur in Heidelberg. His dissertation for the doctorate at Heidelberg was in the field of embryology, but when he returned to Princeton he taught geology while Osborn, who was with him on the Princeton faculty for ten years (1880-1890), taught biology. Both resumed their researches on fossil mammals.

The two early fossil collecting trips were followed by eight others to South Dakota, Wyoming, Oregon, and Montana from 1882 to 1893. These were mostly rather short excursions, supported by students who paid for the privilege of working in the field with Scott. Although one expedition was characterized by Scott, him-

self, as a "complete failure" and the fruits of another were mainly destroyed by some workmen at Princeton, the results of these expeditions were extensive and they formed the foundation on which Hatcher, Sinclair, and Jepsen have built one of the great teaching and research collections of fossil mammals. For the rest of his life Scott recounted with great zest picturesque anecdotes of his travels in the West. It is probable, however, that the work of fossil collecting was not wholly congenial to him, for after the outstanding collector John Bell Hatcher joined his staff in 1893 Scott never collected another fossil, although then only thirty-five and destined to be an active traveler for another fifty years.

In connection with his teaching at Princeton, Scott wrote three textbooks, on geology (1897), on the evidence for evolution (1917), and on physiography (1922). The first, particularly, was long a standard in its field and was twice extensively revised (1907 and 1932). His original research was mainly devoted to fossil mammals, on which he wrote far too many basic papers and monographs for individual mention here.

Aside from these numerous descriptive papers, Scott's earlier work, especially in the 1890's, was marked by brief but able and important discussions of the broader principles of paleontology and the theoretical factors of evolution. In particular, two of these papers¹ expressed ideas of quite fundamental importance which are, in part, so firmly incorporated in the principles of his science that few, perhaps, today realize this debt to Scott. After the turn of the century, although his studies became even more voluminous and were no less valuable in their way, Scott tended more and more to confine himself to straight description and orthodox taxonomy, while his theoretical outlook tended to narrow rather than to broaden. This trend is of unusual interest in view not only of his earlier work but also of his great admiration for Cope, who was above all a daring theoretician, and of the quite opposite simultaneous trend in the work of his friend and colleague Osborn. Scott's final stand was marked, on one hand, by rather rigid adherence to a set of morphogenetic rules of thumb that had been developed, in part by himself, while he was a student and a young

¹ On the osteology of *Mesohippus* and *Leptomeryx*, with observations on the modes and factors of evolution in the Mammalia, *Jour. Morph.* 5: 301-402, 1891.

Paleontology as a morphological discipline, *Biol. Lect. Mar. Biol. Lab. Wood's Hole*, Summer Session 1895, 43-61, 1896.

teacher and, on the other, by a skeptical, if not despairing, belief that evolution is entirely unexplained although conceivably explicable.

He continued to turn out much other work, but Scott's last forty-five years were especially marked by two great projects. The first of these grew out of the Princeton University expeditions to Patagonia in 1896-1899 under the leadership of J. B. Hatcher. Scott undertook to edit the extensive reports of these expeditions and to write sections on some of the groups of fossil mammals from the Santa Cruz formation. With an intermission of several years during the First World War, Scott was occupied with this task over a period of more than thirty years. In preparation for this, he made a trip to Europe (one of many) to arrange for printing of the reports and lithography of the plates there. As groundwork for his own study of South American fossil mammals he also traveled to the Argentine, where he studied the Santa Cruz mammals in the La Plata Museum and in the private collection of the Ameghino brothers, to whom most of the previous knowledge of this fauna was due. Publication of the Patagonian reports began in 1901 and was finally completed in 1932, comprising fifteen (nominally eight) luxurious quarto volumes.

This long task was hardly completed when Scott drew up another program almost equally ambitious and involving even more personal research. This was the monograph of the large, classic Oligocene mammalian fauna of the White River group. Work was begun in 1934, four years after Scott's retirement and in his seventy-seventh year. The whole plan was carried out, with the assistance of Scott's successor on the Princeton faculty, Glenn Lowell Jepsen, and with two of the smaller sections written by Albert Elmer Wood. The publication, in five quarto parts, was issued by the American Philosophical Society in 1936-1941. No sooner was this long monograph completed than Scott, now aged eighty-three, planned a similar revision of the late Eocene Uinta fauna. He was working actively on this up to a few days before his death.

During the years of his work on the Patagonian collections, Scott also wrote *A History of Land Mammals in the Western Hemisphere* (1913), which drew on his extensive first-hand acquaintance with both North and South American fossil mammals and summarized everything known on this subject in a way so

skillful that this has become a classic of paleontological literature. A second edition (1937) was entirely rewritten and brought well down to date.

Scott's extensive research in general assures him a high rank among vertebrate paleontologists. He and Osborn tended to dominate the science in this country almost as had Marsh and Cope in the preceding generation. A strictly limited, but not unduly strained, analogy might make Scott the Marsh and Osborn the Cope of their time, in the sense that Scott and Marsh were basically morphologists and made their greatest contributions in the description and classification of fossils while Osborn and Cope, without lacking the morphological sense, were temperamentally inclined to slight this part of the work and to be at their most stimulated and stimulating when dealing with broadly theoretical problems. The analogy fortunately breaks down in other respects. Scott and Osborn indulged in no petty rivalry but remained fast friends. Far from discouraging the entrance of other students into their field, they both trained and helped younger men on all possible occasions. They, themselves, were largely responsible for the fact that they were not isolated scientific giants like their great predecessors but became surrounded by able colleagues in America. Their precedent and example counteracted the disgraceful Cope-Marsh feud and helped to bring about the unusually friendly and cooperative spirit in their science today.

In this place it is proper to stress Scott's long and happy association with the American Philosophical Society. He was elected a member in 1886 at the age of twenty-eight and thereafter he missed few meetings, except during his trips abroad, until the last few years when strength began to fail. On one occasion in unusually bad weather he and one of the secretaries were the only members who managed to turn up for a meeting. Records are not available, but it seems not improbable that his was the most sustained attendance in the history of the Society. This attests the delight that he always felt in this fellowship, and many of the members will long remember the pleasure they derived from his presence. He served the Society in many ways and he was its president in 1918-1925. The Society, in turn, supported much of his research in later years, subsidized his *History of Land Mammals*, and published in its serials many of his monographs and shorter contributions, from 1894 to 1945.

Scott received honorary degrees from Oxford, Harvard, Pennsylvania, and Princeton Universities. He was awarded the Wollaston medal of the Geological Society of London, the Elliott medal and the Thompson medal of the National Academy of Sciences, the Penrose medal of the Geological Society of America, the Kane medal of the Geographical Society of Philadelphia, and the Hayden medal of the Academy of Natural Sciences of Philadelphia. Besides the American Philosophical Society, he was a member of the National Academy of Sciences and of a number of professional societies and he was president of the Geological Society of America in 1925 and of the Paleontological Society in 1911.

Scott told the story of his own life with modesty and humor in *Some Memories of a Paleontologist* (1939). The reader should turn to that volume for a more detailed account of his career as he saw it, for innumerable anecdotes of his life and times, and for restrained mention of his happy marriage and the pleasure and love he found in his family. From that volume, as from acquaintance with him, emerges a picture of unflinching integrity, of a mild but steadfast character, of unassuming worth, and of "a mind at leisure from itself" (as he quoted on his eightieth birthday). More than sadness at its end, one feels gladness for a life so long, rich, and happy.

GEORGE GAYLORD SIMPSON

CLARK WISSLER

(1870-1947)

Clark Wissler, a member of the American Philosophical Society since 1924, died in New York City on August 25, 1947. Although actively engaged in writing and research until shortly before his death, Doctor Wissler had retired from academic responsibilities in 1942 when he relinquished the chairmanship of the Department of Anthropology at the American Museum of Natural History where he had spent virtually his entire scientific life. His was a singularly even and balanced career, productive and influential throughout its course. Substantial, if not flashingly brilliant, his work in the long run will survive.

To those who knew Wissler and his background, the pattern of his scientific career seems a happy reflection of his personality. He was born in Indiana seventy-seven years ago of Pennsylvania Dutch

stock although his direct European ancestors actually came from a part of Old Swabia now located in Switzerland. To some of his colleagues he always appeared as the very embodiment of this combination of Midwest and Pennsylvania Dutch. He was perceptive but slow to action, judicious, and ready to seek a compromise. Little or nothing of the crusader or zealot emerged in his overt behavior. His curve, as he would have phrased it, was always to accept the facts or the situation as it was and to see what could be done about it. In this sense he was realistic or practical. Because of this natural inclination, he rarely if ever revolted or spearheaded a drive, preferring to negotiate and to find a middle ground. Quietly and with little heat, he generally attained his objective. As a result he was an excellent negotiator who was sometimes, if erroneously, considered a "politician."

His way of life, his manners, his attitudes, even his turns of phrase retained, after more than forty years of residence in the East, a distinct flavor of the Indiana small town of his youth. He himself, however, found increasingly a loss of contact with his "pays" on his annual summer visits "back home." This background nevertheless was a great source of strength to him and a distinct advantage for it gave him an understanding and an easy approach to the varieties of Americans that he had to deal with in his professional work. He was a "homey," comfortable man.

Anthropological research and writing filled most of Wissler's life. Later as increasing years and professional success made him, in the American academic fashion, subject to numerous administrative demands, he filled these roles too with much quiet satisfaction. The roster of his chairmanships, committees, and offices is very long and notable for solid achievement.

Despite his busy life, he found time in the latter part of his career to take on the burdens of teaching as an extra task. As Professor of Anthropology at Yale, he spent one day a week in New Haven where he met his students. He enjoyed these contacts and proved to be a wise and generous guide. His quiet pride in his "boys" was apparent in the pleasure he took in reporting their successes and accomplishments.

The subjects that he chose to investigate also were consistent with his personality and his general approach to life. His was not an introspective or introverted mind. He never seemed to be too concerned with the hidden motivations or the psychological sub-

tleties of people, preferring to accept the objective and overt aspects of their behavior and to draw what conclusions he could from them. Thus his most characteristic research centered primarily in material culture and classic ethnography. His major contributions—the elaboration of the culture area concept to explain the distribution of cultural phenomena and his field studies of the Blackfoot and the Dakota—illustrate his strength and predilections. Nevertheless his interests were wide and catholic. His bibliography reveals a considerable range in the subjects that he touched upon even though he may have persisted in pursuing only a more limited range.

As an administrative superior he had certain virtues that some of his subordinates deeply appreciated. He rarely, if ever, interfered with the scientific freedom and integrity of his staff. Always ready to listen sympathetically to their problems or reports of progress, he seldom attempted to guide or coerce them into fields or problems that might have been more congenial to his own interests. During eighteen years as my chief, he never once laid the heavy hand of authority upon my activities. As a consequence his department was generally known throughout anthropological circles to be one of the happiest places in which to work.

HARRY L. SHAPIRO

XI

LIST OF MEMBERS

MEMBERS RESIDING WITHIN THE UNITED STATES

	Date of Election
Abbot, Charles Greeley, M.Sc., D.Sc., LL.D. Astrophysicist, Research Associate, Smithsonian Institution, Washington 25, D. C.	1914
Adams, Edwin Plimpton, M.S., Ph.D., Sc.D. Professor Emeritus of Physics, Princeton University, Princeton, N. J.	1915
Adams, James Truslow, A.M., LL.D., Litt.D., L.H.D. Author, American Historian. Sheffield House, Southport, Conn.	1938
Adams, Roger, A.B., A.M., Ph.D., Sc.D. Head of the Chemistry Department, University of Illinois. 603 Michigan Avenue, Urbana, Ill.	1935
Adams, Walter Sydney, A.M., Sc.D., LL.D. Astronomer, Research Associate, Carnegie Institution of Washington and California Institute of Technology; Di- rector (ret.), Mount Wilson Observatory, Pasadena 4, Calif.	1915
Aitken, Robert Grant, A.M., Sc.D., LL.D. Astronomer, Director Emeritus, Lick Observatory. 1109 Spruce Street, Berkeley 7, Calif.	1919
Albright, William F., Ph.D., Litt.D., D.H.L., Th.D. Orientalist and Archaeologist, Professor of Semitic Languages, Johns Hopkins University, Baltimore 18, Md.	1929
Alexander, James W., A.M., Ph.D., A.A. Professor of Mathematics, Institute for Advanced Study. 29 Cleveland Lane, Princeton, N. J.	1928
Allen, Charles Elmer, Ph.D., Sc.D. Professor Emeritus of Botany, University of Wisconsin. 2014 Chamberlin Avenue, Madison 5, Wis.	1922
Anderson, Carl David, Ph.D. Professor of Physics, California Institute of Technology, Pasadena 4, Calif.	1938

	Date of Election
Andrews, Donald Hatch, A.B., Ph.D.	1933
Chairman, Chemistry Department, Director, Chemistry Laboratory, Johns Hopkins University. 204 Southway, Guilford, Baltimore 18, Md.	
Andrews, Roy Chapman, A.B., A.M., Sc.D.	1927
Zoologist, Honorary Director, American Museum of Natural History. Colebrook, Conn.	
Angell, James Rowland, A.B., A.M., Ph.D., Litt.D., LL.D.	1924
Psychologist, President Emeritus, Yale University; Educational Counselor, National Broadcasting Company. 155 Blake Road, Hamden, New Haven, Conn.	
Armstrong, Hamilton Fish, A.B.	1940
Writer; Editor, <i>Foreign Affairs</i> . 58 East 68th Street, New York 21, N. Y.	
Aydelotte, Frank, A.M., B.Litt., L.H.D., LL.D., D.Litt., D.C.L.	1923
Director Emeritus, Institute for Advanced Study; Amer- ican Secretary to the Rhodes Trustees; Chairman, Educa- tional Advisory Board, Guggenheim Foundation. Princeton, N. J.	
Bailey, Irving Widmer, A.B., M.F., Sc.D.	1926
Professor of Plant Anatomy, Harvard University. 17 Buckingham Street, Cambridge 38, Mass.	
Bailey, Liberty Hyde, Litt.D., LL.D.	1896
Botanist, Professor Emeritus of Agriculture (Horticulture), Director, Bailey Hortorium, Cornell University, Ithaca, N. Y.	
Bancroft, Wilder Dwight, A.B., Ph.D., Sc.D., LL.D.	1920
Professor Emeritus of Physical Chemistry, Cornell University. 7 East Avenue, Ithaca, N. Y.	
Barnard, Chester Irving, Sc.D., LL.D.	1943
Economist and Administrator, President, New Jersey Bell Telephone Company, 540 Broad Street, Newark 1, N. J.	
Bartlett, Harley Harris, A.B.	1929
Chairman, Department of Botany, Director, Botanical Garden, University of Michigan. 1601 Brooklyn Avenue, Ann Arbor, Mich.	
Baugh, Albert Croll, Ph.D., LL.D.	1946
Felix E. Schelling Memorial Professor of English, University of Pennsylvania, Philadelphia 4, Pa.	

	Date of Election
Bayne-Jones, Stanhope, M.D., M.A., Sc.D. Professor of Bacteriology, Yale University School of Medicine, 333 Cedar Street, New Haven 11, Conn.	1944
Beadle, George Wells, Ph.D. Professor of Biology, California Institute of Technology, Pasadena 4, Calif.	1945
Beams, Jesse Wakefield, Ph.D. Professor of Physics, University of Virginia. Monroe Hill, University, Va.	1939
Beard, Charles Austin, LL.D., Litt.D., Ph.D. Historian, Formerly Professor of Politics, Columbia University. New Milford, Conn.	1936
Beeson, Charles Henry, Ph.D. Professor of Latin, University of Chicago. 1228 East 56th Street, Chicago 37, Ill.	1940
Bell, Eric Temple, Ph.D. Professor of Mathematics, California Institute of Technology. 434 South Michigan Avenue, Pasadena 5, Calif.	1937
Benedict, Francis Gano, Ph.D., Sc.D., M.D. Physiologist, Director (ret.), Nutrition Laboratory, Carnegie Institution of Washington (1907-37). Machiasport, Maine.	1910
Berkey, Charles Peter, B.S., M.S., Ph.D., Sc.D. Newberry Professor Emeritus of Geology, Columbia University, New York 27, N. Y.	1928
Bethe, Hans Albrecht, Ph.D. Professor of Physics, Cornell University, Ithaca, N. Y.	1947
Bigelow, Henry Bryant, Ph.D. President, Woods Hole Oceanographic Institution; Alexander Agassiz Professor of Zoology, Harvard University. Museum of Comparative Zoology, Cambridge 38, Mass.	1937
Birge, Edward Asahel, Ph.D., LL.D., Sc.D. Zoologist, President Emeritus, University of Wisconsin. 2011 Van Hise Avenue, Madison 5, Wis.	1923
Birge, Raymond Thayer, A.M., Ph.D. Professor of Physics, University of California. 1639 La Vereda Street, Berkeley 4, Calif.	1943
Blackwelder, Eliot, Ph.D. Professor Emeritus of Geology, Stanford University, Calif.	1939

	Date of Election
Blake, Robert Pierpont, Ph.D., LL.D. Professor of History, Harvard University. 40 Appleton Street, Cambridge 38, Mass.	1944
Blakeslee, Albert Francis, B.A., M.A., Ph.D., D.Sc. Visiting Professor of Botany, Director, Genetics Experiment Station, Smith College, Northampton, Mass.	1924
Blegen, Carl William, Ph.D., M.A. Professor of Classical Archaeology, Fellow of the Graduate School of Arts and Sciences, University of Cincinnati, Cincinnati 21, Ohio.	1941
Bliss, Gilbert Ames, B.S., M.S., Ph.D., Sc.D. Professor Emeritus of Mathematics, University of Chicago. Flossmoor, Ill.	1926
Bloomfield, Leonard, Ph.D. Professor of Linguistics, Yale University, New Haven 11, Conn.	1942
Bogert, Marston Taylor, A.B., Ph.B., Sc.D., LL.D., R.N.D. Professor Emeritus of Organic Chemistry, Columbia University. 1158 Fifth Avenue, Apartment 14B, New York 29, N. Y.	1909
Bolton, Herbert Eugene, Ph.D., D.Litt., L.H.D., LL.D. Sather Professor Emeritus of History, University of California, Berkeley 4, Calif.	1937
Bonbright, James Cummings, B.S., Ph.D. Professor of Finance, Columbia University. 29 Claremont Avenue, New York, N. Y.	1946
Bonner, Campbell, A.M., Ph.D. Professor Emeritus of the Greek Language and Literature, University of Michigan. 1025 Martin Place, Ann Arbor, Mich.	1938
Boring, Edwin Garrigues, M.E., Ph.D. Professor of Psychology, Emerson Hall, Harvard University, Cambridge 38, Mass.	1945
Bowen, Ira Sprague, Ph.D. Professor of Physics, Mount Wilson Observatory, Pasadena 4, Calif.	1940
Bowen, Norman L., M.A., B.Sc., Ph.D., Sc.D., LL.D. Geologist, Geophysical Laboratory, 2801 Upton Street, N.W., Washington 8, D. C.	1930

	Date of Election
Bowman, Isaiah, B.S., Ph.D., M.A., D.Sc., LL.D. Geographer, President, Johns Hopkins University, Baltimore 18, Md.	1923
Boyd, Julian Parks, A.B., A.M., D.Litt. Librarian, Princeton University, Princeton, N. J.	1943
Bridgman, Percy Williams, A.M., Ph.D., Sc.D. Physicist, Hollis Professor of Mathematics and Natural Philosophy, Harvard University. Research Laboratory of Physics, Cambridge 38, Mass.	1916
Briggs, Lyman J., Ph.D., Sc.D., D.Eng., LL.D. Physicist, Director Emeritus, National Bureau of Standards. 3208 Newark Street, Cleveland Park, Washington 8, D. C.	1935
Bronk, Detlev W., M.S., Ph.D., Sc.D. Professor of Biophysics, Director, Eldridge Reeves Johnson Foundation for Medical Physics; Director, Institute of Neurology, University of Pennsylvania, Philadelphia 4, Pa.	1934
Brooks, Van Wyck, Litt.D. Author and Literary Historian, 350 East 57th Street, New York 22, N. Y.	1939
Brown, W. Norman, A.B., Ph.D. Professor of Sanskrit, University of Pennsylvania, Philadelphia 4, Pa.	1946
Buck, Carl Darling, A.B., Ph.D., Litt.D. Professor Emeritus of Comparative Philology, University of Chicago. 5609 Kenwood Avenue, Chicago 37, Ill.	1923
Buckley, Oliver Ellsworth, B.S., D.Sc., Ph.D. Physicist and Engineer, President, Bell Telephone Laboratories, 463 West Street, New York 14, N. Y.	1942
Buddington, Arthur F., Ph.D., Sc.D. Professor of Geology, Chairman, Department of Geology, Princeton University, Princeton, N. J.	1931
Burgess, Warren Randolph, Ph.D., LL.D. Banker and Statistician, Vice Chairman, National City Bank of New York. 30 West 54th Street, New York 19, N. Y.	1942
Burns, Arthur Frank, Ph. D. Professor of Economics, Columbia University. 370 Central Park West, New York, N. Y.	1947

	Date of Election
Bush, John Nash Douglas, B.A., M.A., Ph.D. Professor of English, Harvard University. 3 Clement Circle, Cambridge 38, Mass.	1946
Bush, Vannevar, Sc.D., Eng.D., LL.D. Engineer, President, Carnegie Institution of Washington, Washington 5, D. C.	1937
Byrd, Richard Evelyn, Ph.D., D.Eng., Sc.D., LL.D. Geographer, Navigator, Rear-Admiral (ret.), United States Navy. 9 Brimmer Street, Boston, Mass.	1930
Calvert, Philip Powell, Ph.D. Professor Emeritus of Zoology, University of Pennsylvania. P. O. Box 14, Cheyney, Pa.	1918
Campbell, Douglas Houghton, Ph.D., LL.D. Professor Emeritus of Botany, Stanford University, Calif.	1910
Capps, Edward, Ph.D., LL.D., Litt.D., L.H.D. Professor Emeritus of Classics, Princeton University, 42 Mercer Street, Princeton, N. J.	1920
Carlson, Anton Julius, A.M., Ph.D., M.D., LL.D., Sc.D. Professor Emeritus of Physiology, University of Chicago. 5228 Greenwood Avenue, Chicago, Ill.	1928
Carmichael, Leonard, Ph.D., Sc.D., Litt.D., LL.D. Psychologist, President, Tufts College, Medford 55, Mass.	1942
Carpenter, Rhys, Ph.D., Litt.D. Professor of Archaeology, Bryn Mawr College. Jerry Run, R. D. 2, Downingtown, Pa.	1935
Case, Ermine Cowles, A.B., A.M., M.S., Ph.D. Professor Emeritus of Historical Geology and Paleontology, University Museums Building, University of Michigan, Ann Arbor, Mich.	1931
Castle, William Bosworth, M.D., S.M. Professor of Medicine, Harvard University; Associate Director, Thorndike Memorial Laboratory, and Director, Second and Fourth Medical Services (Harvard), Boston City Hospital, Boston 18, Mass.	1939
Castle, William Ernest, A.M., Ph.D., Sc.D., LL.D. Professor Emeritus of Genetics, Harvard University; Research Associate in Genetics, University of California. Hilgard Hall, Berkeley 4, Calif.	1910
Chafee, Zechariah, Jr., A.B., LL.B., LL.D., D.C.L. Professor of Law, Harvard University Law School. 26 Elmwood Avenue, Cambridge, Mass.	1946

	Date of Election
Chamberlain, Joseph Perkins, Ph.D., LL.D. Professor of Public Law, Columbia University. 8 Sutton Square,, New York 22, N. Y.	1940
†Chamberlin, Rollin Thomas, Ph.D., Sc.D. Professor of Geology, University of Chicago. 9300 Pleasant Avenue, Chicago 20, Ill.	1943
Chandrasekhar, Subrahmanyan, M.A., Ph.D., Sc.D. Professor of Theoretical Astrophysics, Yerkes Observatory, University of Chicago, Williams Bay, Wis.	1945
Chaney, Ralph Works, B.S., Ph.D. Professor of Paleontology and Curator of Paleobotanical Collections, University of California; Research Associate, Carnegie Institution of Washington. University of California, Berkeley 4, Calif.	1943
Chase, George Henry, A.B., A.M., Ph.D., L.H.D., Litt.D., LL.D. Professor Emeritus of Archaeology, Harvard University. 1 Bryant Street, Cambridge 38, Mass.	1929
Chinard, Gilbert, B.L., L.èsL., LL.D. Professor of French Literature, Princeton University. 93 Mercer Street, Princeton, N. J.	1932
Clark, John Maurice, L.H.D., Ph.D., LL.D. Professor of Economics, Columbia University. Westport, Conn.	1944
Clark, William Mansfield, Ph.D., Sc.D. De Lamar Professor of Physiological Chemistry, Johns Hopkins University, School of Medicine, Baltimore 5, Md.	1939
Clarke, Hans Thacher, D.Sc. Professor of Biochemistry, College of Physicians and Surgeons, Columbia University. 630 W. 168th Street, New York 32, N. Y.	1943
Cleland, Ralph Erskine, A.B., M.S., Ph.D. Professor and Head, Department of Botany and Bacteriology, Indiana University, Bloomington, Ind.	1932
Coble, Arthur Byron, Ph.D., LL.D. Professor of Mathematics (on leave of absence), University of Illinois. Haverford College, Haverford, Pa.	1939

†Deceased March 6, 1948.

	Date of Election
†Cockerell, Theodore Dru Alison, D.Sc. Professor Emeritus of Zoology, University of Colorado. 908 10th Street, Boulder, Colo.	1928
Cole, Fay-Cooper, Ph.D., Sc.D., LL.D. Professor of Anthropology, Chairman of the Department, University of Chicago. 5626 Dorchester Avenue, Chicago 37, Ill.	1941
Compton, Arthur Holly, B.Sc., Ph.D., Sc.D., LL.D. Physicist, Chancellor, Washington University, St. Louis 5, Mo.	1925
Compton, Karl Taylor, Ph.D., Sc.D., D.Eng., LL.D. Physicist, President, Massachusetts Institute of Technology, Cambridge 39, Mass.	1923
Conant, James Bryant, Ph.D., LL.D., S.D., L.H.D., D.C.L., D.Sc. Chemist, President, Harvard University. 11 Quincy Street, Cambridge 38, Mass.	1935
Conklin, Edwin Grant, Ph.D., Sc.D., LL.D. Professor Emeritus of Biology, Princeton University, Princeton, N. J.	1897
Coolidge, William David, Ph.D., Sc.D. Physicist, Director, Research Laboratories of the General Electric Company. 1480 Lenox Road, Schenectady 8, N. Y.	1938
Cori, Carl Ferdinand, M.D. Professor of Pharmacology and Biochemistry. Washington University, St. Louis 5, Mo.	1947
Corner, George Washington, M.D., Sc.D., D. Hon. Caus. Director, Department of Embryology, Carnegie Institution of Washington, Wolfe and Madison Streets, Baltimore 5, Md.	1940
Corwin, Edward Samuel, Ph.D., LL.D., Litt.D. Professor Emeritus of Jurisprudence, Princeton University, Princeton, N. J.	1936
Cottrell, Frederick Gardner, Ph.D., LL.D. Chemist, Consultant to Research Corporation, New York. 1557 Waverley Street, Palo Alto, Calif.	1938
Crane, Robert Treat, Ph.D., LL.B. Formerly Executive Director, Social Science Research Council. 7 Temple Street, Stonington, Conn.	1941

†Deceased January 26, 1948.

	Date of Election
Crew, Henry, Ph.D. Professor Emeritus of Physics, Northwestern University. 620 Library Place, Evanston, Ill.	1921
Crocker, William, A.B., A.M., Ph.D. Botanist, Director, Boyce Thompson Institute for Plant Research, Inc. 1086 North Broadway, Yonkers 3, N. Y.	1931
Cross, Whitman, B.S., Ph.D., Sc.D. Geologist, Member (ret.), United State Geological Survey. 101 E. Kirke Street, Chevy Chase 15, Md.	1915
Cross, Wilbur L., A.B., Ph.D., Litt.D., L.H.D., LL.D. Governor of Connecticut (1931-39); Professor Emeritus of English, Yale University; Editor of <i>The Yale Review</i> . 24 Edgehill Road, New Haven 11, Conn.	1934
Daly, Reginald Aldworth, A.M., Ph.D., Sc.D. Professor of Geology, Harvard University. 23 Hawthorn Street, Cambridge 38, Mass.	1913
Dāmrosch, Walter Johannes, Mus.D. Musician, Conductor. 168 East 71st Street, New York 21, N. Y.	1939
Danforth, Charles Haskell, Ph.D., Sc.D. Professor of Anatomy, Stanford University. 607 Cabrillo Avenue, Stanford University, Calif.	1944
Darrach, William, A.B., A.M., M.D., Sc.D., LL.D. Professor of Clinical Surgery, Dean Emeritus of the Medical Faculty, Columbia University. 180 Fort Washington Avenue, New York 32, N. Y.	1929
Darrow, Karl Kelchner, Ph.D. Research Physicist, Bell Telephone Laboratories. 230 West 105th Street, New York 25, N. Y.	1936
Davis, Bradley Moore, A.M., Ph.D. Professor Emeritus of Botany, University of Michigan, Ann Arbor, Mich.	1914
Davis, Harvey Nathaniel, A.B., A.M., Ph.D., Sc.D., LL.D., D.Eng. Mechanical Engineer, President, Stevens Institute of Technology. Hoxie House, Castle Point, Hoboken, N. J.	1935
Davis, John William, A.B., LL.B., LL.D. Lawyer. 15 Broad Street, New York 5, N. Y.	1923

	Date of Election
Davisson, Clinton J., Ph.D., D.Sc. Physicist, Member (ret.), Bell Telephone Laboratories. University of Virginia, Charlottesville, Va.	1929
Day, Arthur L., Ph.D., Sc.D. Geophysicist, Director (ret.), Geophysical Laboratory (1907-36), Carnegie Institution of Washington. 9113 Old Georgetown Road, Bethesda 14, Md.	1912
Day, Edmund Ezra, Ph.D., LL.D. Economist, President, Cornell University, Ithaca, N. Y.	1937
Debye, Peter Chairman, Department of Chemistry, and Professor of Chemistry, Cornell University, Ithaca, N. Y.	1936
Delano, Frederic Adrian Administrator. 2400 16th Street, N.W., Washington 9, D. C.	1935
Dempster, Arthur Jeffrey, A.B., A.M., Ph.D., Sc.D. Professor of Physics, University of Chicago. 5757 Kenwood Avenue, Chicago 37, Ill.	1932
Derleth, Charles, Jr., C.E., LL.D. Engineer, Professor Emeritus of Civil Engineering, University of California, Berkeley 4, Calif.	1936
Detwiler, Samuel Randall, Ph.D. Professor of Anatomy, Columbia University. 630 West 168th Street, New York 32, N. Y.	1940
Dewey, Bradley, A.B., B.S., Hon. D.Sc., Hon. LL.D. Chemical Engineer, President, Dewey and Almy Chemical Company, Cambridge, Mass.	1945
Dewey, John, A.B., Ph.D., LL.D. Professor Emeritus of Philosophy, Columbia University. 1158 Fifth Avenue, New York 29, N. Y.	1911
Dickinson, John, Ph.D., LL.B., LL.D. Professor of Law, University of Pennsylvania; General Counsel, Pennsylvania Railroad Company. 1740 Broad Street Station Building, Philadelphia 3, Pa.	1940
Dinsmoor, William Bell, Litt.D. Professor of Archaeology, Columbia University, New York 27, N. Y.	1933
Dobzhansky, Theodosius Professor of Zoology, Columbia University, New York 27, N. Y.	1942

	Date of Election
Dodds, Harold Willis, Ph.D., LL.D. Administrator, President, Princeton University, Princeton, N. J.	1935
Doisy, Edward Adelbert, M.S., Ph.D. Professor of Biochemistry, St. Louis University School of Medicine. 444 Sherwood Drive, Webster Groves, Mo.	1942
Douglas, Lewis Williams, B.A., LL.D. United States Ambassador to Great Britain; President, Mutual Life Insurance Company of New York. 34 Nassau Street, New York 5, N. Y.	1942
Douglass, Andrew Ellicott, D.Sc. Professor of Astronomy and Dendrochronology, University of Arizona, Tucson, Ariz.	1941
Dresden, Arnold, M.S., Ph.D. Professor of Mathematics, Swarthmore College. 606 Elm Avenue, Swarthmore, Pa.	1932
Duane, Morris, A.B., LL.B. Lawyer, Duane, Morris and Heckscher. 1617 Land Title Building, Philadelphia 10, Pa.	1940
DuBois, Eugene Floyd, M.D. Professor of Physiology, Cornell University Medical College. 1300 York Avenue, New York 21, N. Y.	1940
DuBridge, Lee Alvin, A.M., Ph.D., Sc.D. Physicist, President, California Institute of Technology, Pasadena 4, Calif.	1942
Duggar, Benjamin Minge, A.M., Ph.D., LL.D. Professor Emeritus of Plant Physiology and Plant Pathology, University of Wisconsin. Care Lederle Laboratories, Inc., Pearl River, N. Y.	1921
Dunbar, Carl Owen, A.B., Ph.D. Professor of Paleontology and Stratigraphy, Director, Peabody Museum, Yale University, New Haven 11, Conn.	1942
Dunn, Gano, M.S., E.E., D.Sc., D.Eng. Engineer, President, J. G. White Engineering Corporation; President, Cooper Union for the Advancement of Science and Art. 80 Broad Street, New York 4, N. Y.	1924
Dunn, L(eslie) Clarence, B.S., M.S., Sc.D. Professor of Zoology and Executive Officer, Department of Zoology, Columbia University, New York 27, N. Y.	1943

	Date of Election
Du Pont, Pierre Samuel, B.S. Chemist, Manufacturer, E. I. du Pont de Nemours and Company. Du Pont Building, Wilmington 98, Del.	1917
Durand, William Frederick, Ph.D., LL.D. Professor Emeritus of Mechanical Engineering, Stanford University, Calif.	1917
Edgerton, Franklin, Ph.D. Professor of Sanskrit and Comparative Philology, Yale University. 1504 "A" Yale Station, New Haven 11, Conn.	1935
Einstein, Albert, Ph.D., M.D. Professor Emeritus of Theoretical Physics, Institute for Advanced Study, Princeton, N. J.	1930
Eisenhart, Luther Pfahler, A.B., Ph.D., Sc.D., LL.D. Professor Emeritus of Mathematics, Dean Emeritus, Graduate School, Princeton University. 25 Alexander Street, Princeton, N. J.	1913
Elvehjem, Conrad Arnold, Ph.D., Sc.D. Professor of Biochemistry, Dean of Graduate School, University of Wisconsin, Madison 6, Wis.	1947
Erlanger, Joseph, B.S., M.D., LL.D., Sc.D. Professor Emeritus of Physiology, Washington University. 4580 Scott Avenue, St. Louis 10, Mo.	1927
Evans, Griffith Conrad, Ph.D. Professor of Mathematics, University of California. 820 San Diego Road, Berkeley 7, Calif.	1941
Eyring, Henry, Ph.D. Chemist, Dean, Graduate School, University of Utah, Salt Lake City, Utah.	1941
Fay, Sidney Bradshaw, A.B., Ph.D., L.H.D., Litt.D. Professor of History, Harvard University. 194 Brattle Street, Cambridge 38, Mass.	1947
Fels, Samuel S., LL.D. President, Fels and Company, Paschall Oxygen Company. 39th and Walnut Streets, Philadelphia 4, Pa.	1939
Fenn, Wallace Osgood, Ph.D. Professor of Physiology, University of Rochester, School of Medicine and Dentistry, 260 Crittenden Boulevard, Rochester 7, N. Y.	1946

	Date of Election
Ferguson, William Scott, A.M., Ph.D., LL.D., Litt.D. MacLean Professor of Ancient and Modern History, Harvard University. 8 Scott Street, Cambridge 38, Mass.	1937
Fermi, Enrico, Ph.D. Professor of Physics, University of Chicago, Chicago 37, Ill.	1939
Fernald, Merritt Lyndon, S.B., D.C.L., D.Sc. Professor of Natural History, Director, Gray Herbarium, Harvard University, Cambridge 38, Mass.	1936
Fetter, Frank Albert, Ph.D., LL.D. Professor Emeritus of Political Economy, Princeton University. 168 Prospect Avenue, Princeton, N. J.	1935
Fieser, Louis Frederick, Ph.D. Sheldon Emery Professor of Organic Chemistry, Harvard University. 27 Pinehurst Road, Belmont 38, Mass.	1941
Foote, Paul Darwin, A.B., M.A., Ph.D. Physicist, Executive Vice-president, Gulf Research and Development Company. P.O. Drawer 2038, Pittsburgh 30, Pa.	1927
Forbes, Alexander, A.B., A.M., M.D. Professor of Physiology, Harvard Medical School, Shattuck Street, Boston 15, Mass.	1931
Ford, Guy Stanton, Ph.D., Litt.D., LL.D., L.H.D. Executive Secretary and Editor, <i>American Historical Review</i> . Study 274, Library of Congress Annex, Washington 25, D. C.	1939
Fosdick, Raymond Blaine, B.A., M.A., LL.B., LL.D. Lawyer, President, Rockefeller Foundation and General Education Board, 49 West 49th Street, New York 20, N. Y.	1930
Franck, James, Ph.D., LL.D. Professor of Physical Chemistry, University of Chicago, Chicago 37, Ill.	1937
Frankfurter, Felix, LL.B. Associate Justice, Supreme Court of the United States, Washington, D. C.	1939
Fred, Edwin Broun, Ph.D. Bacteriologist, President, University of Wisconsin, Madison 6, Wis.	1945

	Date of Election
Freeman, Douglas Southall, Ph.D., LL.D., D.Litt., Litt.D., L.H.D. Editor, <i>The Richmond News Leader</i> , Richmond 13, Va.	1943
Frost, Robert, L.H.D., Litt.D. Poet, Professor of English, Amherst College. South Shaftsbury, Vt.	1937
Gaposchkin, Cecilia Payne, B.A., Ph.D. Astronomer, Harvard College Observatory, Cambridge 38, Mass.	1936
Gasser, Herbert Spencer, A.M., M.D., Sc.D., LL.D. Physiologist, Director, Rockefeller Institute for Medical Research, 66th Street and York Avenue, New York 21, N. Y.	1937
Gates, Thomas Sovereign, Ph.B., LL.B., LL.D., Ph.D. Administrator, Chairman of the Trustees, University of Pennsylvania. 2015 Packard Building, Philadelphia 2, Pa.	1930
Giauque, William Francis, Ph.D., Sc.D. Professor of Chemistry, University of California, Berkeley 4, Calif.	1940
Gies, William J., B.S., Ph.B., M.S., Ph.D., Sc.D., LL.D. Professor of Biological Chemistry (ret.), Columbia University Medical School. 630 West 168th Street, New York 32, N. Y.	1915
Gifford, Walter Sherman, A.B., LL.D., D.C.L. Administrator, Chairman of the Board, American Telephone and Telegraph Company. 195 Broadway, New York 7, N. Y.	1931
Goodpasture, Ernest William, M.D., M.S., D.Sc. Professor of Pathology, School of Medicine, Vanderbilt University, Nashville 4, Tenn.	1943
Goodrich, Carter, A.B., Ph.D. Professor of Economics, Columbia University, New York 27, N. Y.	1946
Goodrich, Herbert Funk, A.B., LL.B., LL.D. Judge, United States Circuit Court of Appeals, Third Circuit. 8128 St. Martin's Lane, Chestnut Hill, Philadelphia 18, Pa.	1937
Graham, Evarts Ambrose, M.D., Sc.D., LL.D., M.S. Professor of Surgery, Washington University School of Medicine, St. Louis 10, Mo.	1941

	Date of Election
Graves, Frank Pierrepont, Ph.D., Litt.D., L.H.D., LL.D., J.U.D., D.C.L. Educator. 303 Woodlawn Avenue, Albany, N. Y.	1927
Gregg, Alan, M.D. Director for the Medical Sciences, The Rockefeller Foundation. 30 Cambridge Road, Scarsdale, N. Y.	1944
Gregory, Herbert Ernest, Ph.D., D.Sc. Silliman Professor Emeritus of Geology, Yale University ; Director Emeritus, Bernice P. Bishop Museum, Honolulu, Hawaii.	1923
Gregory, William King, A.M., Ph.D., D.Sc. Da Costa Professor Emeritus of Vertebrate Paleontology, Columbia University; Curator Emeritus, Departments of Comparative Anatomy and Ichthyology, American Museum of Natural History, New York 24, N. Y.	1925
Gulick, Charles Burton, Ph.D. Eliot Professor Emeritus of Greek Literature, Harvard University. 59 Fayerweather Street, Cambridge 38, Mass.	1940
Haney, John Louis, A.B., A.M., B.S., Ph.D., LL.D. Educator, President (ret.), Central High School of Philadelphia. 6419 Woodbine Avenue, Overbrook, Philadelphia 31, Pa.	1929
Harkins, William Draper, A.B., Ph.D. Professor of Physical Chemistry, University of Chicago. 5437 Ellis Avenue, Chicago, Ill.	1925
Harrison, Ross G., M.A., Ph.D., M.D., Sc.D., LL.D. Professor Emeritus of Biology, Yale University ; Chairman, National Research Council. 142 Huntington Street, New Haven 11, Conn.	1913
Harvey, E. Newton, Ph.D. Henry Fairfield Osborn Professor of Biology, Princeton University, Princeton, N. J.	1929
Hastings, A. Baird, Ph.D., Sc.D., B.S. Hamilton Kuhn Professor of Biological Chemistry, Harvard Medical School, Boston 15, Mass.	1941
Hawk, Philip Bovier, M.S., Ph.D. Chemist. 30 Rockefeller Plaza, Room 4631, New York 20, N. Y.	1915

	Date of Election
Hayes, Carlton Joseph Huntley, Ph.D., Litt.D., LL.D., L.H.D. Seth Low Professor of History, Columbia University. 88 Morningside Drive, New York 27, N. Y.	1940
Heaton, Herbert, M.A., M.Com., Litt.D. Professor of Economic History, University of Minnesota. 141 Bedford Street, Minneapolis 14, Minn.	1945
Heiser, Victor George, A.B., M.D., Sc.D., LL.D. Physician. Bantam, Conn.	1918
Hendrickson, George Lincoln, A.B., L.H.D. Professor of Greek and Latin Literature, 851 Branford College, Yale University, New Haven 11, Conn.	1932
Hisaw, Frederick Lee, Ph.D., LL.D. Professor of Zoology, Harvard University, Cambridge 38, Mass.	1940
Hobbs, William Herbert, A.M., Ph.D., D.Eng., LL.D. Professor Emeritus of Geology, University of Michigan. 1005 Berkshire Road, Ann Arbor, Mich.	1909
Hocking, William Ernest, Ph.D., L.H.D., D.D., Th.D., LL.D. Professor Emeritus of Philosophy, Harvard University. Madison, N. H.	1943
Holland, Leicester Bodine, B.S., B.S. in Arch., Ph.D. 415 West Price Street, Germantown, Philadelphia 44, Pa.	1931
Hooton, Earnest A., B.A., M.A., Ph.D., B.Litt., Sc.D. Professor of Anthropology, Curator of Somatology, Peabody Museum, Harvard University, Cambridge 38, Mass.	1931
Hoover, Herbert, Dr.Eng., M.D., Sc.D., LL.D., D.C.L., J.D. Engineer, Thirty-first President of the United States. Stanford University, Calif.	1918
Hopkins, B Smith, Ph.D., D.Sc., LL.D. Professor Emeritus of Inorganic Chemistry, University of Illinois, Urbana, Ill.	1927
Hopkinson, Edward, Jr., A.B., LL.B. Lawyer, Banker, Trustee, University of Pennsylvania. P.O. Box 7468, Philadelphia 1, Pa.	1938

	Date of Election
Howard, Leland Ossian, M.D., Ph.D., Sc.D., LL.D. Zoologist, Consulting Entomologist, United States Public Health Service. Bureau of Entomology, United States Department of Agriculture, Washington 25, D. C.	1911
Hubble, Edwin P., B.Sc., Ph.D., B.A., D.Sc., LL.D. Astronomer, Mount Wilson Observatory, Pasadena 4, Calif.	1929
Hudson, Manley Ottmer, A.M., LL.B., S.J.D., LL.D., D.C.L. Judge, Permanent Court of International Justice; Bemis Professor of International Law, Harvard University, Cambridge 38, Mass.	1941
Huebner, Solomon Stephen, Ph.D., Sc.D., B.L., M.L. Professor of Insurance and Commerce, University of Pennsylvania. 697 South Highland Avenue, Merion, Pa.	1930
Hughes, Charles Evans, A.B., A.M., LL.B., LL.D., D.C.L. Chief Justice of the United States (ret.). 2223 R Street, N.W., Washington 8, D. C.	1926
Hulett, George A., A.B., Ph.D. Professor Emeritus of Physical Chemistry, Princeton University. 44 Washington Road, Princeton, N. J.	1913
Humphreys, William Jackson, A.B., C.E., Ph.D., Sc.D. Professor Emeritus of Meteorological Physics, George Washington University; Collaborator, United States Weather Bureau. Cosmos Club, Washington 5, D. C.	1929
Hunsaker, Jerome Clarke, D.Sc. Head, Department of Mechanical Engineering, Massachusetts Institute of Technology; Professor in Charge, Guggenheim Aeronautical Laboratory, Cambridge 39, Mass.	1940
Hunter, Walter Samuel, Ph.D. Professor of Psychology, Director, Psychological Laboratory, Brown University. 61 Prospect Street, Providence 6, R. I.	1941
Huntington, Edward Vermilye, A.B., A.M., Ph.D., Sc.D. Mathematician, Professor Emeritus of Mechanics, Harvard University. 48 Highland Street, Cambridge 38, Mass.	1933

	Date of Election
Ives, Herbert E., B.S., Ph.D., Sc.D. Physicist, Bell Telephone Laboratories. 32 Laurel Place, Montclair, N. J.	1917
Jackson, Dugald Caleb, C.E., D.Sc., D.Eng. Professor Emeritus of Electrical Engineering, Massachusetts Institute of Technology. 5 Mercer Circle, Cambridge 38, Mass.	1931
Jacobs, Merkel Henry, A.B., Ph.D. Professor of General Physiology, University of Pennsylvania, Philadelphia 4, Pa.	1930
Jaeger, Werner Wilhelm, Ph.D., Litt.D. Professor of Classical Philology, Harvard University. 43 Bailey Road, Watertown, Mass.	1944
Jayne, Horace Howard Furness, A.B., A.M. Archaeologist, Vice-director, Metropolitan Museum of Art, New York 28, N. Y.	1934
Jenkins, Charles Francis, A.M., LL.D. Man of Affairs, President, Historical Society of Pennsylvania. "Far Country," Kitchen's Lane, Mt. Airy, Philadelphia 19, Pa.	1944
Jessup, Philip C., LL.B., LL.D., Ph.D. Professor of International Law, Columbia University, New York 27, N. Y.	1939
Jewett, Frank Baldwin, A.B., Ph.D., D.Sc., D.Eng., LL.D. Engineer, President, National Academy of Sciences, New York Museum of Science and Industry. 140 West Street, New York 7, N. Y.	1938
Johnson, Alvin Saunders, Ph.D. Economist, Director and Chairman, Graduate Faculty of Political Science, New School for Social Research. Nyack, N. Y.	1942
Johnson, Emory R., Litt.M., Ph.D., Sc.D. Professor Emeritus of Transportation and Commerce, Logan Hall, University of Pennsylvania, Philadelphia 4, Pa.	1915
Johnston, John, B.Sc., D.Sc. Chemist, Research Director (ret.), U. S. Steel Corporation. Box 115, Southwest Harbor, Me.	1946

	Date of Election
Jones, Howard Mumford, M.A., Litt.D., L.H.D. Professor of English, Harvard University, Cambridge 38, Mass.	1941
Joslin, Elliott Proctor, B.A., M.A., Ph.B., Sc.D., M.D. Physician, Clinical Professor Emeritus of Medicine, Harvard Medical School. 81 Bay State Road, Boston 15, Mass.	1925
Kármán, Theodor von, Ph.D., D.Eng., D.Sc. Professor of Aeronautics, Director, Guggenheim Aeronautics Laboratory, California Institute of Technology. 1501 South Marengo Avenue, Pasadena, Calif.	1941
Kelley, Nicholas, A.B., LL.B. Lawyer, Member of the Firm, Rathbone, Perry, Kelley, and Drye; Vice-president, General Counsel and Director, Chrysler Corporation. 70 Broadway, New York 4, N.Y.	1942
Keniston, (Ralph) Hayward, A.B., A.M., Ph.D. Professor of Romance Languages and Chairman of the Department, University of Michigan. 1915 Austin Avenue, Ann Arbor, Mich.	1944
Kettering, Charles Franklin, M.E., E.E., D.Eng., D.Sc. Research Engineer, Vice-president, General Motors Corporation; General Director, Research Laboratories Division, General Motors Corporation. Ridgeleigh Terrace, Dayton, Ohio.	1930
Keyes, Frederick George, M.S., Ph.D., D.Sc. Professor and Head, Department of Chemistry, Massachusetts Institute of Technology. 15 Berkeley Street, Cambridge, Mass.	1938
Kidder, Alfred Vincent, Ph.D., LL.D. Archaeologist, Chairman, Division of Historical Research, Carnegie Institution of Washington. 10 Frisbie Place, Cambridge 38, Mass.	1934
Kimball, Fiske, A.B., M.Arch., Ph.D., Dr. of Fine Arts Director, Philadelphia Museum of Art, Philadelphia 30, Pa.	1943
Kirkwood, John Gamble, B.S., Ph.D. Arthur Amos Noyes Professor of Chemistry, California Institute of Technology, Crellin Laboratory, Pasadena 4, Calif.	1944

	Date of Election
Kistiakowsky, George Bogdan, Ph.D. Professor of Chemistry, Harvard University, 12 Oxford Street, Cambridge 38, Mass.	1940
Kline, John Robert, A.B., A.M., Ph.D., Sc.D. Professor of Mathematics, Chairman of the Department, University of Pennsylvania, Philadelphia 4, Pa.	1941
Köhler, Wolfgang, Ph.D. Professor of Psychology, Swarthmore College. 603 Elm Avenue, Swarthmore, Pa.	1939
Kraus, Charles August, Ph.D. Professor Emeritus of Chemistry, Brown University. 92 Keene Street, Providence, R. I.	1939
Kroeber, Alfred Louis, Ph.D. Professor of Anthropology, Director, Anthropological Museum, University of California, Berkeley 4, Calif.	1941
Kunkel, Louis Otto, Ph.D. Botanist, Member, Rockefeller Institute for Medical Research, Princeton, N. J.	1942
Lamb, Arthur Becket, Ph.D., D.Sc. Professor of Chemistry, Director, Chemical Laboratory, Harvard University. 12 Oxford Street, Cambridge, Mass.	1936
†Lamont, Thomas William, A.B., LL.D. Banker, Trustee. 23 Wall Street, New York 8, N. Y.	1932
Lampland, Carl O., A.B., A.M., LL.D. Astronomer, Lowell Observatory, Flagstaff, Ariz.	1931
Lancaster, Henry Carrington, M.A., Ph.D., D.Hon.Caus. Professor of French Literature, Chairman, Department of Romance Languages, Johns Hopkins University. 604 Edgevale Road, Baltimore 10, Md.	1938
Landis, James McCauley, LL.B., S.J.D. Director, U. S. Office of Civilian Defense, Dean, Harvard Law School; Chairman, Civil Aeronautics Board. 2480 Sixteenth Street, N.W., Washington, D. C.	1942
Langer, William Leonard, Ph.D., LL.D. Coolidge Professor of History, Harvard University. 1 Berkeley Street, Cambridge 38, Mass.	1944
Langmuir, Irving, M.A., Ph.D., Sc.D., LL.D. Chemist and Physicist, Associate Director, Research Laboratory, General Electric Company, Schenectady, N. Y.	1922

† Deceased February 2, 1948.

	Date of Election
Lashley, Karl Spencer, M.S., Ph.D., Sc.D. Research Professor of Neuropsychology, Harvard University. Director, Yerkes Laboratories of Primate Biology, Orange Park, Fla.	1938
Lattimore, Owen Director, Walter Hines Page School of International Relations, Johns Hopkins University, Baltimore 18, Md.	1943
Lawrence, Ernest Orlando, B.S., A.M., Ph.D., Sc.D., LL.D. Professor of Physics, Director, Radiation Laboratory, University of California, Berkeley 4, Calif.	1937
Lawson, Andrew Cowper, M.A., Ph.D., Sc.D., LL.D. Professor of Mineralogy and Geology (ret.), University of California, Berkeley 4, Calif.	1925
Leeds, Morris Evans, D.Eng. Chairman of the Board, Leeds and Northrup Company. 1025 Westview Street, Philadelphia 19, Pa.	1940
Lefschetz, Solomon, M.E., Ph.D. Henry B. Fine Professor of Mathematics, Princeton University. 129 Broadmead, Princeton, N. J.	1929
Leith, Charles Kenneth, B.S., Ph.D., LL.D., D.Sc. Professor Emeritus of Geology, University of Wisconsin. Moraine, Old Sauk Road, Madison, Wis.	1926
Leland, Waldo G., A.B., A.M., Litt.D., L.H.D., LL.D. Historian, Director Emeritus, American Council of Learned Societies, 1219 Sixteenth Street, N. W., Washington 6, D. C.	1931
Leuschner, Armin Otto, A.B., Ph.D., Sc.D., LL.D. Professor Emeritus of Astronomy, Director Emeritus, Students' Observatory, University of California. 1816 Scenic Avenue, Berkeley 4, Calif.	1924
Lewis, Clarence Irving, Ph.D., L.H.D. Professor of Philosophy, Harvard University. 23 Oakland Street, Lexington 73, Mass.	1942
Lewis, Edwin Owen, LL.B. Judge, Court of Common Pleas No. 2, Room 344, City Hall, Philadelphia 7, Pa.	1946
Lewis, George William, M.E., M.M.E., Sc.D., D.Eng. Aeronautical Engineer, Director, Aeronautical Research, National Advisory Committee for Aeronautics. 6502 Ridgewood Avenue, Chevy Chase, Md.	1944

	Date of Election
Lewis, Warren Harmon, B.S., M.D. Anatomist, Member, The Wistar Institute of Anatomy and Biology, Woodland Avenue and 36th Street, Philadelphia 4, Pa.	1943
Lillie, Ralph Stayner, B.A., Ph.D., Sc.D. Professor Emeritus of General Physiology, University of Chicago. 5545 Kenwood Avenue, Chicago 37, Ill.	1937
Lind, Samuel Colville, A.B., S.B., Ph.D., D.Sc. Physical Chemist, Dean, Institute of Technology, University of Minnesota, Minneapolis 14, Minn.	1943
Lingelbach, William E., B.A., Ph.D., Litt.D. Professor Emeritus of Modern European History, University of Pennsylvania. 4304 Osage Avenue, Philadelphia 4, Pa.	1916
Lippmann, Walter Political Scientist. Writer for <i>New York Herald-Tribune</i> . 3525 Woodley Road, Washington 16, D. C.	1947
†Livingston, Burton E., B.S., Ph.D. Professor Emeritus of Plant Physiology, Johns Hopkins University. Riderwood, Md.	1933
Loeb, Leo, M.D. Professor Emeritus of Pathology, Washington University. 40 Crestwood Drive, St. Louis 5, Mo.	1910
Long, Esmond Ray, Ph.D., M.D. Director, Henry Phipps Institute, Professor of Pathology, University of Pennsylvania. Henry Phipps Institute, Seventh and Lombard Streets, Philadelphia 47, Pa.	1940
Loomis, Alfred Lee, A.B., LL.B., D.Sc., M.Sc., LL.D. Physicist, Director, Loomis Laboratories. Tuxedo Park, N. Y.	1930
Lovejoy, Arthur Oncken, A.B., A.M., LL.D., L.H.D. Professor Emeritus of Philosophy, Johns Hopkins University. 827 Park Avenue, Baltimore 1, Md.	1932
Lovett, Edgar Odell, Ph.D., Sc.D., LL.D. Mathematician and Astronomer, President Emeritus, The Rice Institute, Houston 1, Texas.	1904
Lowie, Robert Harry, Ph.D., Sc.D. Professor of Anthropology, University of California. 2521 Benvenue Avenue, Berkeley 4, Calif.	1942

†Deceased February 8, 1948.

	Date of Election
Lydenberg, Harry Miller, L.H.D., Litt.D. Formerly Director, New York Public Library. 118 East Avondale, Greensboro, N. C.	1939
Lyman, Theodore, A.M., Ph.D. Professor Emeritus of Physics, Director, Jefferson Laboratory, Harvard University, Cambridge 38, Mass.	1918
McClelland, George William, Ph.D., LL.D. Professor of English, President, University of Pennsylvania. 4037 Pine Street, Philadelphia 4, Pa.	1941
McClintock, Barbara, Ph.D. Resident Investigator, Department of Genetics, Carnegie Institution of Washington, Cold Spring Harbor, Long Island, N. Y.	1946
McClure, Charles Freeman Williams, A.B., A.M., Sc.D. Professor Emeritus of Comparative Anatomy, Princeton University. 1 Battle Road, Princeton, N. J.	1897
McCollum, Elmer Verner, Ph.D., Sc.D., LL.D. Biochemist, Professor Emeritus of Biochemistry, School of Hygiene and Public Health, Johns Hopkins University, 615 North Wolfe Street, Baltimore, Md.	1945
McDaniel, Walton Brooks, A.B., A.M., Ph.D. Professor Emeritus of Latin Language and Literature, University of Pennsylvania. 4082 Malaga Avenue, Coconut Grove, Miami 33, Fla.	1917
MacDougal, Daniel Trembly, M.A., M.S., Ph.D., LL.D. Botanist. R. F. D. L. No. 170, Carmel, Calif.	1916
McGregor, James Howard, B.S., M.A., Ph.D. Professor of Zoology, Columbia University, New York 27, N. Y.	1929
McIlwain, Charles Howard, A.M., Ph.D., LL.D. Professor Emeritus of the Science of Government, Harvard University. 180 Mercer Street, Princeton, N. J.	1938
MacInnes, Duncan Arthur, B.S., M.S., Ph.D. Physical Chemist, Member, Rockefeller Institute for Medical Research, 66th Street and York Avenue, New York 21, N. Y.	1942
MacIver, Robert Morrison, M.A., Ph.D., B.A., Litt.D. Lieber Professor of Political Philosophy and Sociology, Columbia University. Palisades, N. Y.	1942

	Date of Election
McMath, Robert Reynolds, B.C.E., A.M., D.Sc. Founder and Director, McMath-Hulbert Observatory, University of Michigan, Lake Angelus, R. F. D. 4, Box 104, Pontiac, Mich.	1942
MacNider, William de Berniere, M.D., Sc.D., LL.D. Kenan Research Professor of Pharmacology, University of North Carolina, Chapel Hill, N. C.	1939
Malone, Kemp, A.B., Litt.D., Ph.D. Caroline Donovan Professor of English Literature, Johns Hopkins University. 2710 Maryland Avenue, Baltimore 18, Md.	1945
Mann, Thomas, D.Litt. Author. 1550 San Remo Drive, Pacific Palisades, Calif.	1942
Marshall, George Catlett Secretary of State, Washington, D. C.	1946
Marvel, Carl Shipp, A.B., Ph.D. Professor of Organic Chemistry, University of Illinois, Urbana, Ill.	1945
Mason, William Smith, Ph.B., A.M., L.H.D., D.Litt. Man of Affairs, Collector of Franklinsiana, University Trustee. 100 Los Altos Drive, Pasadena 2, Calif.	1928
Mather, Frank Jewett, Jr., Ph.D., L.H.D. Professor Emeritus of Art and Archaeology, Princeton University. Evelyn Place, Princeton, N. J.	1940
Mees, Charles Edward Kenneth, D.Sc., F.R.S. Chemist, Vice-president in Charge of Research, Eastman Kodak Company, Rochester 4, N. Y.	1937
Menzel, Donald Howard, A.B., A.M., Ph.D. Professor of Astrophysics, Harvard University, Cambridge 38, Mass.	1943
Meritt, Benjamin Dean, Ph.D., D.Litt., LL.D. Professor of Greek Epigraphy, Institute for Advanced Study, Princeton, N. J.	1938
Merriam, Charles Edward, Ph.D., LL.D. Professor Emeritus of Political Science, University of Chicago. 6041 University Avenue, Chicago 37, Ill.	1935
Merrill, Elmer Drew, B.S., M.S., Sc.D., LL.D. Arnold Professor of Botany, Harvard University. Arnold Arboretum, Jamaica Plain 30, Mass.	1932

	Date of Election
Merrill, Paul Willard, Ph.D. Astronomer, Mount Wilson Observatory, Carnegie Institution of Washington, Pasadena 4, Calif.	1939
Metz, Charles William, Ph.D. Professor of Zoology, Director, Zoological Laboratory, University of Pennsylvania, Philadelphia 4, Pa.	1941
Miles, Walter Richard, Ph.D. Professor of Psychology, Yale University, 333 Cedar Street, New Haven 11, Conn.	1944
Miller, Gerrit Smith, Jr., A.B. Associate in Biology, United States National Museum, Washington 25, D. C.	1927
Miller, Hunter, LL.B., LL.M., D.C.L. International Law. Craiglands, R. M. D. 1, Victoria, B. C., Canada.	1928
Millikan, Robert Andrews, Ph.D., LL.D., Sc.D. Chairman of Executive Council Emeritus, California Institute of Technology, Pasadena 4, Calif.	1914
Minot, George Richards, A.B., M.D., S.D. Professor of Medicine, Harvard University; Director, Thorndike Memorial Laboratory, and Visiting Physician, Boston City Hospital, Boston 18, Mass.	1935
Mitchell, Samuel Alfred, Ph.D., LL.D. Professor Emeritus of Astronomy, Director, Leander McCormick Observatory, University of Virginia, University, Va.	1923
Mitchell, Wesley Clair, A.B., Ph.D., LL.D., D.Litt. Professor Emeritus of Economics, Columbia University; Director of Research, National Bureau of Economic Research. Westover Road, Stamford, Conn.	1931
Moe, Henry Allen, B.A., B.C.L., M.A., B.S., L.H.D. Lawyer, Secretary-General, Guggenheim Memorial Foundation, 551 Fifth Avenue, New York 17, N. Y.	1943
Montgomery, James Alan, Ph.D., S.T.D., Litt.D., D.H.L. Philologist, Formerly Director and President, American Schools of Oriental Research; Professor Emeritus of Hebrew, Graduate School, University of Pennsylvania. 6806 Greene Street, Germantown, Philadelphia 19, Pa.	1925
Moore, George Thomas, A.M., Ph.D. Botanist, Director, Missouri Botanical Garden, St. Louis 10, Mo.	1905

	Date of Election
Moore, J. Percy, Ph.D. Professor Emeritus of Zoology, University of Pennsylvania, Philadelphia 4, Pa.	1918
Morey, Charles Rufus, A.M., L.H.D., Litt.D. Marquand Professor Emeritus of Art and Archæology, Princeton University, Princeton, N. J.	1938
Morgan, Marshall S., A.B. Man of Affairs. Fidelity-Philadelphia Trust Company, 123 South Broad Street, Philadelphia 9, Pa.	1933
Morison, Samuel Eliot, Ph.D., M.A., Litt.D. Professor of History, Harvard University. 44 Brimmer Street, Boston 8, Mass.	1937
Morley, Sylvanus Griswold, Ph.D. In Charge, Carnegie Institution of Washington Archæological Expeditions to Central America; Director, Chichen Itza Project. Apartado Postal 385, Merida, Yucatan, Mexico.	1940
Morris, Harrison Smith Author, Formerly Managing Director, Pennsylvania Academy of the Fine Arts. 1600 Cheltenham Avenue, Philadelphia 26, Pa.	1899
Morris, Lawrence J., A.B. Man of Affairs, Secretary, Pennsylvania Hospital. 48 Bourse Building, Philadelphia 6, Pa.	1936
Morse, Marston, Ph.D., Sc.D. Professor of Mathematics, Institute for Advanced Study, Princeton, N. J.	1936
Moulton, Forest Ray, A.B., Ph.D., Sc.D., LL.D. Mathematician, Astronomer, Permanent Secretary, American Association for the Advancement of Science, 1515 Massachusetts Avenue, Washington 5, D. C.	1916
Moulton, Harold Glenn, Ph.D., LL.D. Economist, President, The Brookings Institution, 722 Jackson Place, N.W., Washington 6, D. C.	1938
Muller, Hermann Joseph, Ph.D., D.Sc. Professor of Zoology, Indiana University, Bloomington, Ind.	1947
Mulliken, Robert Sanderson, B.S., Ph.D., Sc.D. Professor of Physics, University of Chicago, Chicago 37, Ill.	1940

	Date of Election
Mumford, Lewis Author. Amenia, N. Y.	1941
Murlin, John Raymond, A.M., Ph.D., Sc.D. Professor Emeritus of Physiology, Department of Vital Economics, University of Rochester, 260 Crittenden Boulevard, Rochester 7, N. Y.	1932
Murnaghan, Francis Dominic, M.A., Ph.D. Professor of Applied Mathematics, Chairman of the Department of Mathematics, Johns Hopkins University. 6202 Sycamore Road, Baltimore 12, Md.	1942
Murphy, Robert Cushman, M.A., Sc.D. Chairman, Department of Birds, American Museum of Natural History, Central Park West at 79th Street, New York 24, N. Y.	1946
Neugebauer, O. E., Ph.D., LL.D. Professor of the History of Mathematics, Brown University, Providence 12, R. I.	1947
von Neumann, John, Ph.D., C.E. Professor of Mathematics, Institute for Advanced Study. 26 Westcott Road, Princeton, N. J.	1938
Nicholas, John Spangler, Ph.D. Sterling Professor of Biology, Osborn Zoological Labora- tory, Yale University, New Haven 11, Conn.	1946
Nichols, Roy Franklin, A.B., A.M., Ph.D., Litt.D., L.H.D. Professor of History, University of Pennsylvania. 438 Riverview Road, Swarthmore, Pa.	1945
Nicolson, Marjorie Hope, Ph.D., Litt.D., L.H.D., LL.D. Professor of English, Columbia University, New York 27, N. Y.	1941
Niebuhr, Reinhold, B.D., A.M., D.D. Professor of Applied Christianity, Union Theological Seminary, Broadway at 120th Street, New York 27, N. Y.	1947
Nitze, William Albert, Ph.D., L.H.D. Professor of French, University of California at Los Angeles. 411 Lomond Avenue, Los Angeles 24, Calif.	1936
Nock, Arthur Darby, LL.D. Frothingham Professor of the History of Religion, Harvard University. K21 Eliot House, Cambridge 38, Mass.	1941

	Date of Election
Norris, George William, B.A., M.D. Physician, Author, Erstwhile Chief, Medical Service "A", Pennsylvania Hospital. Dimock, Susquehanna County, Pa.	1922
Northrop, John Howard, M.A., Ph.D., D.Sc., LL.D. Biochemist, Rockefeller Institute for Medical Research, Princeton, N. J.	1938
Notestein, Frank W., B.S., Ph.D. Demographer, Professor, Director of Office of Population Research, School of Public and International Affairs, Princeton University, Princeton, N. J.	1945
Notestein, Wallace, Ph.D., Litt.D. Sterling Professor of English History, Yale University. 236 Edwards Street, New Haven, Conn.	1946
Novy, Frederick G., Sc.D., M.D., LL.D. Dean Emeritus, Medical School, Professor Emeritus of Bacteriology, University of Michigan, Ann Arbor, Mich.	1934
Noyes, William Albert, Jr., A.B., D.-és-Sc. Charles Frederick Houghton Professor of Chemistry and Chairman of the Department, University of Rochester, Rochester 3, N. Y.	1947
Ogburn, William Fielding, Ph.D., LL.D. Sewell L. Avery Distinguished Service Professor of Sociology, University of Chicago. 1126 East 59th Street, Chicago 37, Ill.	1940
Olivier, Charles P., M.A., Ph.D. Professor of Astronomy, Director, Flower and Cook Observatories, University of Pennsylvania, Upper Darby, Pa.	1932
O'Neill, Eugene Gladstone, Litt.D. Author, Playwright. Random House, 20 East 57th Street, New York 22, N. Y.	1935
Oppenheimer, J. Robert, A.B., Ph.D. Physicist, Director, Institute for Advanced Study, Princeton, N. J.	1945
Osgood, Charles Grosvenor, B.A., Ph.D. Professor Emeritus of English, Princeton University. 92 Stockton Street, Princeton, N. J.	1943
Osterhout, Winthrop John Vanleuven, A.M., Ph.D., Sc.D. Physiologist, Member Emeritus, Rockefeller Institute for Medical Research, 66th Street and York Avenue, New York 21, N. Y.	1917

	Date of Election
Packard, Francis Randolph, M.D., LL.D. Physician, Author. 304 South 19th Street, Philadelphia 3, Pa.	1933
Painter, Theophilus Shickel, Ph.D., Sc.D. Zoologist, President, University of Texas. 610 West 33rd Street, Austin, Texas.	1939
Panofsky, Erwin, Ph.D. Professor of History of Art, Institute for Advanced Study. 97 Battle Road, Princeton, N. J.	1943
Parker, George Howard, Sc.D. Professor Emeritus of Zoology, Harvard University. 16 Berkeley Street, Cambridge 38, Mass.	1911
Patterson, Ernest Minor, A.B., A.M., Ph.D., LL.D. Professor of Economics, University of Pennsylvania. 404 South 47th Street, Philadelphia 43, Pa.	1932
Patterson, Lamar Gray Chemist. Perdido Beach, Ala.	1898
Pauling, Linus Carl, Ph.D., Sc.D. Professor of Chemistry, Chairman, Division of Chemistry and Chemical Engineering, Director, Gates and Crellin Laboratories of Chemistry, California Institute of Technology, Pasadena 4, Calif.	1936
Pegram, George Braxton, A.B., Ph.D., D.Sc. Professor of Physics, and Dean of the Faculties of Political Science, Philosophy and Pure Science, Columbia University, New York 27, N. Y.	1947
Pender, Harold, A.B., Ph.D., Sc.D. Dean, Moore School of Electrical Engineering, University of Pennsylvania; Consulting Engineer. 200 South 33rd Street, Philadelphia 4, Pa.	1917
Pepper, George Wharton, B.A., LL.B., LL.D., D.C.L. Lawyer. Formerly Professor of Law, University of Pennsylvania. 2231 Land Title Building, Philadelphia 10, Pa.	1897
Pepper, O. H. Perry, B.S., M.D., Sc.D. Professor of Medicine, University of Pennsylvania. Ithaca, Pa.	1944
Perry, Ralph Barton, Ph.D., Litt.D., L.H.D., LL.D. Professor Emeritus of Philosophy, Harvard University. 445 Widener Library, Cambridge 38, Mass.	1939

	Date of Election
Post, Chandler Rathfon, A.B., A.M., Ph.D. Boardman Professor of Fine Arts, Harvard University. Fogg Museum of Art, Cambridge 38, Mass.	1946
Pound, Roscoe, Ph.D., LL.D., J.U.D., L.H.D. University Professor at Harvard. 304 School Street, Watertown 72, Mass.	1940
Putnam, Herbert, Litt.D., LL.D. Librarian Emeritus of Congress, Washington, D. C.	1937
Quinn, Arthur Hobson, Ph.D., Litt.D. John Welsh Centennial Professor of History and English Literature, University of Pennsylvania. 401 Pembroke Road, Bala-Cynwyd, Pa.	1940
Rabi, Isidor Isaac, B.Chem., Ph.D., Professor of Physics, Columbia University, New York 27, N. Y.	1941
Read, Conyers, A.M., Ph.D., B.Litt., Litt.D. Professor of English History, University of Pennsylvania. Box 593, Villa Nova, Pa.	1934
Redfield, Robert, J.D., Ph.D. Professor and Chairman, Department of Anthropology, University of Chicago, Chicago 37, Ill.	1947
Repplier, Agnes, Litt.D. Author. 920 Clinton Street, Philadelphia 7, Pa.	1928
Rhoads, Charles James, A.B. Man of Affairs. Trustee, Bryn Mawr College, Haverford College. Bryn Mawr, Pa.	1921
Richards, Alfred Newton, Ph.D., Sc.D., M.D.(hon.), LL.D. Vice-president in charge of Medical Affairs, University of Pennsylvania. 6 Rugby Road, Bryn Mawr, Pa.	1935
Richter, Gisela Marie Augusta, Litt.D., M.A., L.H.D., D.F.A. Archaeologist, Curator, Greek and Roman Department, Metropolitan Museum of Art. 1170 Fifth Avenue, New York 29, N. Y.	1942
Riddle, Oscar, A.B., Ph.D., LL.D. Physiologist, Member (ret.), Carnegie Institution, Station for Experimental Evolution, Cold Spring Harbor. Route 4, Plant City, Florida	1926

	Date of Election
Rivers, Thomas Milton, M.D., Sc.D. Physician, Director, Hospital of the Rockefeller Institute for Medical Research. 163 Greenway South, Forest Hills, L. I., N. Y.	1942
Robbins, William Jacob, Ph.D., Sc.D. Professor of Botany, Columbia University; Director, New York Botanical Garden, Bronx Park, New York 58, N. Y.	1941
Roberts, Owen J., A.B., LL.B., LL.D., D.C.L. Associate Justice (ret.), Supreme Court of the United States. Birchrunville, R. D., Phoenixville, Pa.	1934
Robertson, Howard Percy, Ph.D. Professor of Mathematical Physics, Norman Bridge Laboratory, California Institute of Technology, Pasadena 4, Calif.	1940
Robinson, David Moore, Ph.D., LL.D., L.H.D., Litt.D. Professor Emeritus of Archæology and Epigraphy, Lecturer in Greek Literature, Johns Hopkins University, Baltimore 18, Md.	1936
Robinson, Fred Norris, Ph.D., Litt.D. Gurney Professor Emeritus of English, Harvard University. 6 Longfellow Park, Cambridge 38, Mass.	1944
Rockefeller, John D., Jr., A.B., A.M. Administrator, Trustee, Rockefeller Institute for Medical Research. 30 Rockefeller Plaza, New York 20, N. Y.	1931
Rogers, Lindsay, Ph.D., LL.B. Burgess Professor of Public Law, Columbia University. 175 Riverside Drive, New York 24, N. Y.	1941
Rosenbach, A. S. W., B.S., Ph.D., D.F.A. Author, Bibliographer, President, Gratz College. 1618 Locust Street, Philadelphia 3, Pa.	1928
Rosenwald, Lessing J., D.H.L. Humanist. Jenkintown, Pa.	1947
Rossby, Carl-Gustaf Arvid, D.Sc. Professor of Meteorology, University of Chicago. Chicago 37, Ill.	1946
Rostovtzeff, Michael I., Ph.D., LL.D. Sterling Professor Emeritus of Ancient History and Archæology; Director of Dura-Europos Research, Yale University. 470 Whitney Avenue, New Haven 11, Conn.	1929

	Date of Election
Rous, Peyton, M.D., D.Sc. Member, Rockefeller Institute for Medical Research. 122 East 82nd Street, New York 28, N. Y.	1939
Russell, Henry Norris, A.M., Ph.D., D.Sc. Professor Emeritus of Astronomy, Princeton University Observatory. 79 Alexander Street, Princeton, N. J.	1913
Ruthven, Alexander G., B.S., Ph.D., LL.D., Sc.D. Zoologist, President, University of Michigan, Ann Arbor, Mich.	1931
Sachs, Paul Joseph, A.B., LL.D. Professor of Fine Arts, Harvard University, Cambridge 38, Mass.	1947
Sanders, Henry A., A.B., A.M., Ph.D., L.H.D. Professor Emeritus of Latin, University of Michigan. 2037 Geddes Avenue, Ann Arbor, Mich.	1932
Sarton, George, Sc.D., L.H.D., LL.D. Historian of Science, Associate, Carnegie Institution of Washington, Professor, Harvard University. Harvard Library 185, Cambridge 38, Mass.	1934
Sauer, Carl O., Ph.D. Professor and Chairman, Department of Geography, University of California. 1340 Arch Street, Berkeley 8, Calif.	1944
Scattergood, J. Henry, A.B. Man of Affairs, Treasurer, Haverford College, Bryn Mawr College. Villa Nova, Pa.	1931
Schaeffer, J. Parsons, A.M., M.D., Ph.D., Sc.D. Professor of General Anatomy, Director, Daniel Baugh Institute of Anatomy, Jefferson Medical College. 4634 Spruce Street, Philadelphia 39, Pa.	1927
Schlesinger, Arthur Meier, Ph.D., Litt.D., L.H.D. Francis Lee Higginson Professor of History, Harvard University. 19 Gray Gardens East, Cambridge 38, Mass.	1941
Schmitt, Bernadotte Everly, M.A. (Oxon.), Ph.D., LL.D., Litt.D. Andrew MacLeish Distinguished Service Professor Emeritus of Modern History, University of Chicago; Special Advisor, Division of Historical Policy Research, Department of State. 323 S. St. Asaph Street, Alexan- dria, Va.	1942

	Date of Election
Schramm, Jacob Richard, A.B., Ph.D. Professor of Botany, Director, Department of Botany, Director, Morris Arboretum, University of Pennsylvania, Philadelphia 4, Pa.	1932
Schultz, Adolph H., Ph.D. Associate Professor of Physical Anthropology, School of Medicine, Johns Hopkins University, Baltimore 5, Md.	1936
Schuyler, Robert Livingston, Ph.D., L.H.D. Gouverneur Morris Professor of History, Columbia University. 1170 Fifth Avenue, New York 29, N. Y.	1942
Seares, Frederick Hanley, B.S., LL.D. Astronomer, Research Associate, Carnegie Institution of Washington. 351 Palmetto Drive, Pasadena 4, Calif.	1917
See, Thomas Jefferson Jackson, A.M., Lt.M., Sc.M., Ph.D., D.Sc. Physicist, Astronomer, Geometer, Professor of Mathematics, United States Navy (ret.). 614 Ohio Street, Vallejo, Calif.	1897
Seitz, Frederick, Jr., A.B., Ph.D. Professor and Head of the Department of Physics, Carnegie Institute of Technology, Schenley Park, Pittsburgh 13, Pa.	1946
Seymour, Charles, Ph.D., Litt.D., LL.D., L.H.D. Historian, President, Yale University. 43 Hillhouse Avenue, New Haven 11, Conn.	1939
Shapley, Harlow, A.M., Ph.D., LL.D., Sc.D., D.Hon.Caus., Litt.D. Astronomer, Director, Harvard College Observatory, Cambridge 38, Mass.	1922
Shope, Richard Edwin, M.D. Pathologist, Member, Rockefeller Institute for Medical Research, Princeton, N. J.	1944
Shotwell, James Thomson, Ph.D., LL.D. Professor Emeritus of the History of International Relations, Columbia University; Trustee and Director, Division of Economics and History, Carnegie Endowment for International Peace. 405 West 117th Street, New York 27, N. Y.	1936
Shryock, Richard Harrison, Ph.D. Professor of History, University of Pennsylvania. 317 Cherry Bend, Merion Station, Pa.	1944

	Date of Election
Shull, George Harrison, B.S., Ph.D., Sc.D., LL.D. Professor Emeritus of Botany and Genetics, Princeton University. 60 Jefferson Road, Princeton, N. J.	1918
Sigerist, Henry Ernest, M.D., D.Litt., LL.D. Professor and Director (resigned) of the Institute of the History of Medicine, Johns Hopkins University. Casa Serena, Pura, Ticino, Switzerland.	1945
Simpson, George Gaylord, Ph.D. Curator of Fossil Mammals, American Museum of Natural History, New York 24, N. Y.	1936
Singer, Edgar Arthur, Jr., B.S., Ph.D., LL.D. Professor Emeritus of Philosophy, University of Pennsylvania. 4224 Chester Avenue, Philadelphia 4, Pa.	1925
Sinnott, Edmund Ware, Ph.D. Sterling Professor of Botany, Yale University, New Haven 11, Conn.	1939
Sioussat, St. George Leakin, Ph.D., L.H.D. Chief, Division of Manuscripts, Incumbent, Chair of American History, Library of Congress. 6309 Connecticut Avenue, Chevy Chase 15, Md.	1928
Slater, John Clarke, Ph.D. Professor of Physics, Massachusetts Institute of Technology, Cambridge 39, Mass.	1940
Slichter, Sumner Huber, A.B., M.A., Ph.D. Economist, Lamont University Professor, Harvard University, 229 Littauer Center, Cambridge 38, Mass.	1946
Slipher, Vesto Melvin, A.M., Ph.D., LL.D., Sc.D. Astronomer, Director, Lowell Observatory, Flagstaff, Ariz.	1921
Smyth, Charles Phelps, Ph.D. Professor of Chemistry, Princeton University. 22 Morven Street, Princeton, N. J.	1932
Smyth, Henry DeWolf, A.B., Ph.D. Professor of Physics and Chairman of the Department, Princeton University, Princeton, N. J.	1947
Speiser, Ephraim Avigdor, M.A., Ph.D. Professor of Semitics, University of Pennsylvania. 7601 West Avenue, Elkins Park, Philadelphia 17, Pa.	1941
Spier, Leslie, Ph.D. Professor of Anthropology, University of New Mexico. Post Office Box 880, Santa Cruz, Calif.	1946

	Date of Election
Spoehr, Herman Augustus, Ph.D., Sc.D. Chairman, Division of Plant Biology, Carnegie Institution of Washington, Stanford University, Calif.	1931
Sprague, Oliver Mitchell Wentworth, A.M., Ph.D., Litt.D. Edmund Cogswell Converse Professor Emeritus of Banking and Finance, Harvard Graduate School of Business, Soldier's Field, Boston, Mass.	1938
Stadie, William Christopher, B.S., M.D. Professor of Research Medicine, University of Pennsylvania, Philadelphia 4, Pa.	1947
Stadler, Lewis John, Ph.D. Professor of Field Crops, University of Missouri; Principal Geneticist, Bureau of Plant Industry, United States Department of Agriculture. 308 Thilly Avenue, Columbia, Mo.	1941
Stakman, Elvin Charles, Ph.D., Dr.Nat.Science Professor and Chief, Division of Plant Pathology and Botany, University of Minnesota Experiment Station; Agent, United States Department of Agriculture. University Farm, St. Paul 8, Minn.	1940
Stanley, Wendell Meredith, Ph.D., Sc.D. Biochemist, Member, Rockefeller Institute for Medical Research, Princeton, N. J.	1940
Stebbins, Joel, Ph.D., Sc.D., LL.D. Professor of Astronomy, Director, Washburn Observatory, University of Wisconsin, Madison 6, Wis.	1925
Stefansson, Vilhjalmur, Ph.D., LL.D. Arctic Explorer, Geographer and Adviser on Northern Operations to Pan-American Airways. 67 Morton Street, New York 14, N. Y.	1923
Stern, Otto, Ph.D., LL.D. Professor Emeritus of Physics, Carnegie Institute of Technology, Pittsburgh. 759 Cragmont Avenue, Berkeley 8, Calif.	1946
Stewart, Walter W., A.B., LL.D. Economist, Professor, School of Economics and Politics, Institute for Advanced Study, Princeton, N. J.	1943
Stock, Chester, Ph.D. Professor of Paleontology, California Institute of Technology, Pasadena 4, Calif.	1946

	Date of Election
Stone, Marshall Harvey, A.M., Ph.D., Sc.D., D.Hon.Caus. Andrew MacLeish Distinguished Service Professor of Mathematics and Chairman, Department of Mathematics, University of Chicago, Chicago 37, Ill.	1943
Streeter, George L., A.B., A.M., M.D., D.Sc., LL.D. Research Associate, Carnegie Institution of Washington. Johns Hopkins Medical School, Baltimore 5, Md.	1943
Struve, Otto, Ph.D., Sc.D. Professor of Astrophysics, University of Chicago; Honorary Director, Yerkes Observatory, Williams Bay, Wis.	1937
Sturtevant, Alfred Henry, Ph.D. Professor of Genetics, California Institute of Technology, Pasadena 4, Calif.	1936
Sturtevant, Edgar Howard, Ph.D., L.H.D., LL.D. Professor Emeritus of Linguistics, Yale University. 408 Whitney Avenue, New Haven, Conn.	1939
Sverdrup, Harald Ulrik, Ph.D. Professor of Oceanography, Director, Scripps Institution of Oceanography, University of California, La Jolla, Calif.	1944
Swann, William Francis Gray, M.A., D.Sc. Physicist, Director, Bartol Research Foundation, Whittier Place, Swarthmore, Pa.	1926
Swindler, Mary Hamilton, A.B., A.M., LL.D., Ph.D. Professor of Classical Archaeology, Bryn Mawr College. Low Buildings, Bryn Mawr, Pa.	1943
Taliaferro, William Hay, Ph.D. Eliakim H. Moore Distinguished Service Professor of Parasitology, Chairman, Department of Bacteriology and Parasitology, Advisor to the President in the Biological Sciences, University of Chicago. 5724 Ellis Avenue, Chicago 37, Ill.	1941
Tate, John Torrence, Ph.D., D.Sc. Research Professor of Physics, University of Minnesota. 518 Southeast 7th Street, Minneapolis, Minn.	1941
Tatlock, J. S. P., Ph.D., Litt.D., LL.D. Professor Emeritus of English, University of California. 50 Dryad's Green, Northampton, Mass.	1937

	Date of Election
Taylor, Deems, A.B., Mus.D., Litt.D. Musician, Composer, Writer. The Haviland Road, Stamford, Conn.	1934
Taylor, Francis Henry, A.B., L.H.D. Director, Metropolitan Museum of Art, New York 28, N. Y.	1946
Taylor, Hugh Stott, D.Sc., LL.D., F.R.S. David B. Jones Professor of Chemistry, Dean, Graduate School, Princeton University, Princeton, N. J.	1928
Taylor, Lily Ross, A.B., Ph.D., Litt.D. Professor of Latin and Dean of the Graduate School, Bryn Mawr College, Bryn Mawr, Pa.	1945
Thompson, Stith, B.A., M.A., Ph.D., Litt.D. Professor of English and Folklore, Dean, Graduate School, Indiana University, Bloomington, Ind.	1947
Thorndike, Edward L., A.B., A.M., Ph.D., Sc.D., LL.D. Professor Emeritus of Educational Psychology, Teachers College, Columbia University, New York 27, N. Y.	1932
Thorndike, Lynn, Ph.D., L.H.D. Professor of History, Columbia University, New York 27, N. Y.	1939
Timoshenko, Stephen P., D.Sc. Professor of Theoretical and Applied Mechanics, Stanford University. 536 West Crescent Drive, Palo Alto, Calif.	1939
Tolman, Edward Chace, B.S., M.A., Ph.D. Professor of Psychology, University of California, Berkeley 4, Calif.	1947
Tolman, Richard Chace, Ph.D. Professor of Physical Chemistry and Mathematical Physics, California Institute of Technology, Pasadena 4, Calif.	1932
Tozzer, Alfred Marston, A.B., A.M., Ph.D. Professor of Anthropology, Harvard University. 7 Bryant Street, Cambridge 38, Mass.	1937
Tucker, Richard Hawley, C.E., Sc.D. Astronomer, Formerly of Lick Observatory. 1525 Waverly Street, Palo Alto, Calif.	1908
Tuve, Merle Antony, B.S., A.M., Ph.D. Chief Physicist, Department of Terrestrial Magnetism, Carnegie Institution of Washington, 5241 Broad Branch Road, Washington 15, D. C.	1943

	Date of Election
Tyzzer, Ernest Edward, Ph.B., A.M., M.D., Sc.D. Professor Emeritus of Comparative Pathology and Tropical Medicine, Harvard Medical School. 175 Water Street, Wakefield, Mass.	1931
Urey, Harold Clayton, Ph.D., D.Sc. Professor of Chemistry, University of Chicago, Chicago 37, Ill.	1935
Van Doren, Carl Author and Historian. 41 Central Park West, New York 23, N. Y.	1942
Van Slyke, Donald Dexter, Ph.D., Sc.D., M.D. Biochemist, Rockefeller Institute for Medical Research, 66th Street and York Avenue, New York 21, N. Y.	1938
Van Vleck, John Hasbrouck, Ph.D. Professor of Mathematical Physics, Harvard University, Cambridge 38, Mass.	1939
Vaughan, Thomas Wayland, B.Sci., A.M., Ph.D., LL.D. Director Emeritus, Scripps Institution of Oceanography; Principal Scientist (ret.), United States Geological Survey; Associate in Paleontology, United States National Museum. 3333 P Street, Washington 7, D. C.	1923
Veblen, Oswald, A.B., Ph.D., D.Sc. Professor Emeritus of Mathematics, Institute for Advanced Study. 58 Battle Road, Princeton, N. J.	1912
du Vigneaud, Vincent, B.S., M.S., Ph.D. Professor of Biochemistry, Cornell University Medical College, 1300 York Avenue, New York 21, N. Y.	1944
Viner, Jacob, Ph.D. Professor of Economics, Princeton University, Princeton, N. J.	1942
Wallace, Henry Agard, B.S., Hon. M.S. Editor, <i>The New Republic</i> , 40 East 49th Street, New York, N. Y.	1943
Warren, Charles, A.B., A.M., LL.D. Lawyer. 1527 Eighteenth Street, Washington 6, D. C.	1939
Warren, Charles Hyde, Ph.B., Ph.D. Dean Emeritus, Sheffield Scientific School, Professor of Mineralogy, Yale University. Litchfield, Conn.	1928

	Date of Election
Weaver, Warren, B.S., C.E., Ph.D. Mathematician, Director, Division of Natural Sciences, Rockefeller Foundation, 49 West 49th Street, New York 20, N. Y.	1944
Webster, David Locke, A.B., Ph.D. Professor and Executive Head, Department of Physics, Stanford University, Calif.	1922
Weed, Lewis Hill, M.D., Sc.D., LL.D. Chairman, Division of Medical Sciences, National Research Council. 3908 North Charles Street, Baltimore 18, Md.	1942
Wertenbaker, Thomas Jefferson, B.A., M.A., Ph.D., L.H.D., Litt.D. Edwards Professor Emeritus of American History, Princeton University. The Waters-Coleman House, Duke of Gloucester Street, Williamsburg, Va.	1941
Westergaard, Harald Malcolm, B.S., Ph.D., Dr.Ing., Dr.Tech., Sc.D. Gordon McKay Professor of Civil Engineering, Dean, Graduate School of Engineering, Harvard University, Pierce Hall, Cambridge 38, Mass.	1942
Westermann, William Linn, Ph.D., LL.D., H.L.D. Professor of History, Columbia University. 23 Donellan Road, Scarsdale, N. Y.	1944
Wetherill, Samuel Price, B.S., LL.D. Man of Affairs. 1203 Morris Building, Philadelphia 2, Pa.	1933
Wetmore, Alexander, A.B., M.S., Ph.D., D.Sc. Zoologist, Secretary, Smithsonian Institution; Director, United States National Museum, Washington 25, D. C.	1930
Weyl, Hermann, Ph.D., D.Eng., D.Sc. Professor of Mathematics, Institute for Advanced Study, Princeton, N. J.	1935
Whipple, George Hoyt, M.D., M.A., D.Sc., LL.D. Professor of Pathology, Dean, School of Medicine and Dentistry, University of Rochester. 320 Westminister Road, Rochester 7, N. Y.	1938
Whitney, Hassler, Ph.B., Mus.B., Ph.D., S.D. Professor of Mathematics, Harvard University, Cambridge 38, Mass.	1947

	Date of Election
Whitney, Willis R., S.B., Ph.D., Sc.D., Ch.D., LL.D. Chemist, Honorary Vice-president, General Electric Company, Research Laboratory, Schenectady 5, N. Y.	1931
Wigner, Eugene Paul, Dr.Ing. Thomas D. Jones Professor of Mathematical Physics, Princeton University, Princeton, N. J.	1944
Williams, John Henry, Ph.D., Sc.D. Nathaniel Ropes Professor of Political Economy, Dean, Graduate School of Public Administration, Harvard University; Vice-president, Federal Reserve Bank of New York. 148 Coolidge Hill, Cambridge 38, Mass.	1942
Williams, Robert R., M.S., D.Sc. Chemical Director (ret.), Bell Telephone Laboratories. 297 Summit Avenue, Summit, N. J.	1942
Willis, Bailey, E.M., C.E., Ph.D. Professor Emeritus of Geology, Stanford University. Box 1365, Stanford University, Calif.	1905
Willits, Joseph Henry, A.M., Ph.D., LL.D. Director for the Social Sciences, Rockefeller Foundation, 49 West 49th Street, New York 20, N. Y.	1938
Wilson, Edgar Bright, Jr., B.S., Ph.D. Associate Professor of Chemistry, Harvard University. 12 Oxford Street, Cambridge 38, Mass.	1946
Wilson, Edwin Bidwell, A.B., Ph.D. Professor Emeritus of Vital Statistics, Harvard School of Public Health. 42 Brington Road, Brookline 46, Mass.	1917
Wilson, George Grafton, Ph.D., LL.D. Professor Emeritus of International Law, Langdell Hall, Harvard University, Cambridge 38, Mass.	1936
Wilson, Harold Albert, M.A., M.Sc., D.Sc. Professor of Physics, The Rice Institute, Houston, Texas	1914
Winlock, Herbert Eustis, Art.D., Litt.D. Director Emeritus and Formerly Curator of the Egyptian Department, Metropolitan Museum of Art. 1010 Fifth Avenue, New York 28, N. Y.	1939
Witmer, Lightner, A.M., Ph.D. Professor Emeritus of Psychology, University of Pennsylvania. Box 186, Devon, Pa.	1897

RESIDENT MEMBERS

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	Date of Election
Wolman, Leo, Ph.D. Professor of Economics, Columbia University. National Bureau of Economic Research, 1819 Broadway, New York 23, N. Y.	1941
Woodworth, Robert Sessions, A.B., A.M., Ph.D., Sc.D., LL.D. Professor Emeritus of Psychology, Columbia University, New York 27, N. Y.	1936
Wright, Frederick E., Ph.D., Sc.D. Petrologist. 2134 Wyoming Avenue, Washington 8, D. C.	1914
Wright, Quincy, A.B., A.M., Ph.D., LL.D. Professor of International Law, University of Chicago, Chicago 37, Ill.	1943
Wright, Sewall, B.S., M.S., Sc.D. Ernest D. Burton Distinguished Service Professor of Zoology, University of Chicago. 5762 Harper Avenue, Chicago 37, Ill.	1932
Wright, William Hammond, D.Sc. Astronomer, Director (ret.), Lick Observatory. 60 North Keeble Avenue, San Jose 11, Calif.	1935
Yeatman, Pope, E.M., D.E. Mining Engineer. 165 Broadway, New York 6, N. Y.	1920
Yerkes, Robert Mearns, Ph.D., D.Sc., LL.D. Professor Emeritus of Psychobiology, Yale University, 333 Cedar Street, New Haven 11, Conn.	1936
Young, Donald Ramsey, A.B., A.M., Ph.D. Professor of Sociology (on leave of absence), Wharton School, University of Pennsylvania. Executive Director, Social Science Research Council, 230 Park Avenue, New York 17, N. Y.	1945
Young, James Thomas, Ph.D., Litt.D. Political Scientist, Professor Emeritus of Public Administration, University of Pennsylvania, Philadelphia 4, Pa.	1933
Young, Owen D., A.B., D.H.L., LL.B., Litt.D., D.C.S. Lawyer, Honorary Chairman, General Electric Company. 570 Lexington Avenue, New York 22, N. Y.	1929
Zeleny, John, M.A., Ph.D. Professor Emeritus of Physics, Yale University. 44 Cold Spring Street, New Haven, Conn.	1915

Total Resident Members—484.

December 31, 1947.

FOREIGN MEMBERS

	Date of Election
Adrian, Edgar Douglas, M.A., M.D., Sc.D., LL.D., F.R.S. Professor of Physiology, Cambridge University. St. Chad's, Grange Road, Cambridge, England.	1938
Alexandroff, Paul Professor of Mathematics, University of Moscow, and Academician of the U.S.S.R., Academy of Sciences, Moscow, U.S.S.R.	1946
Alonso, Amado, Ph.D., LL.D. Director, Instituto de Filología, and Professor, University of Buenos Aires, Buenos Aires, Argentina.	1942
Bartlett, Frederic Charles, B.A., M.A., C.B.E., Hon. D.Phil., F.R.S. Professor of Experimental Psychology, and Director of the Psychological Laboratory, University of Cambridge, Cambridge, England.	1945
Beazley, John Davidson, M.A., F.B.A., Hon. Litt.A., Hon. Litt.D., Hon. Ph.D. Professor of Classical Archaeology, Oxford University, Oxford, England.	1943
Bell, Sir Harold Idris, D.Litt., F.B.A., F.S.A. Formerly Keeper of the Manuscripts and Egerton Librarian, (ret.) British Museum. 8 Birchington Road, Crouch End, London, N. 8, England.	1941
Beneš, Eduard, Ph.D., LL.D. President, Czechoslovak Republic, Prague, Czechoslovakia.	1939
Bohr, Harald Professor of Mathematics, University of Copenhagen, Copenhagen, Denmark.	1945
Bohr, Niels Henrik David, Dr.phil. Professor of Theoretical Physics, University of Copenhagen; Director, Institute of Theoretical Physics. G. 1 Carlsberg, Copenhagen, Denmark.	1940
Bragg, Sir William Lawrence, F.R.S., M.A., Hon. D.Sc., Hon. Ph.D. Professor of Experimental Physics, Cambridge University, Cambridge, England.	1943

	Date of Election
de Broglie, Prince Louis Victor, D.Sc. Professor of Theoretical Physics, University of Paris. 94 Rue Perronet, Neuilly-sur-Seine, France.	1939
Brouwer, Luitzen, Egbertus Jan, Ph.D. Professor of Mathematics, University of Amsterdam, Amsterdam, Netherlands.	1943
Carr, Sir Cecil Thomas, LL.D. Barrister-at-law, Counsel to the Speaker and the House of Commons. The Athenæum, Pall Mall, London, S.W. 1, England.	1944
Clay, Sir Henry, M.A., D.Sc. Economist. Warden of Nuffield College, Oxford. 19 Banbury Road, Oxford, England.	1947
Cook, Arthur Bernard, Litt.D. Professor Emeritus of Classical Archaeology, Queen's College, Cambridge, England.	1944
Craigie, Sir William A., LL.D., D.Litt. Professor Emeritus of English, University of Chicago. Ridgehurst, Watlington, Oxford, England.	1942
Croce, Benedetto, Ph.D., Dr. honoris causa. Italian Historian, Art Critic, and Philosopher. Naples, Italy.	1944
Dale, Sir Henry Hallett, M.D., D.Sc., LL.D., F.R.S. Director, National Institute for Medical Research. 54 Campden Hill Court, Kensington, London, W. 8, England.	1939
De Sanctis, Gaetano Historian and Archaeologist. Pontificia Accademia Romana di Archeologia (Via S. Chiara 61), Rome, Italy.	1946
Dirac, Paul Adrien Maurice, Ph.D., F.R.S. Lucasian Professor of Mathematics, Cambridge University. St. John's College, Cambridge, England.	1938
Einaudi, Luigi, LL.D. Professor of the Science of Finance, Turin University, Turin, Italy.	1947
Fisher, Ronald Aylmer, Sc.D., LL.D., F.R.S. Galton Professor of Eugenics, University College, London. The Galton Laboratory, Rothamsted Experimental Station, Harpenden, Hertfordshire, England.	1941

	Date of Election
García, Godofredo Engineer and Mathematician, Professor in the Faculty of Sciences, University of San Marcos, Lima, Peru.	1943
Gardiner, Alan Henderson, M.A., F.B.A. Egyptologist, Editor, <i>Journal of Egyptian Archaeology</i> . Upton House, Wonston, Nr. Winchester, Hants, London, England.	1943
Gooch, George Peabody, D.Litt. Honorary Fellow, Trinity College, Cambridge University. 76 Campden Hill Road, London, W. 8, England.	1939
Greg, Walter Wilson, F.B.A., Litt.D., Hon. D. Litt., Hon. LL.D. Authority on the English Drama. Standlands, Petworth, Sussex, England.	1945
Heckscher, Eli Filip, Ph.D., D.Sc. Research Professor of Economic History, University of Stockholm. Baldersgaten 10 a, Stockholm, Sweden.	1940
Heisenberg, Werner, Ph.D. Professor of Theoretical Physics, University of Leipzig. Bozenerweg 14, Leipzig, Germany.	1937
Hertzprung, Ejnar Director, Leiden Observatory, Leiden, Netherlands.	1941
Hill, Archibald Vivian, Sc.D., LL.D., M.D. Physiologist, Foulerton Research Professor and Secretary of the Royal Society. University of London, University College, Gower Street, London, W.C. 1, England.	1938
Hjort, Johan, Ph.D., Sc.D. Professor of Marine Biology, Oslo University, Oslo, Norway.	1939
Houssay, Bernardo Alberto, M.D., Dr. honoris causa Director, Instituto de Biología y Medicina Experimental, Costa Rica 4185, Buenos Aires, Argentina.	1944
Hu Shih, Ph.D., LL.D., Litt.D., L.H.D., D.C.L. Chairman, Academia Sinica; Chancellor, Peking National University. 104 East 81st Street, New York 28, N. Y.	1936
Irvine, Sir James Colquhoun, C.B.E., Ph.D., Sc.D., LL.D., D.C.L., F.R.S. Chemist, Principal and Vice-chancellor, University of St. Andrews, Fifeshire, Scotland.	1933

	Date of Election
Jones, Harold Spencer, Sc.D., F.R.S. Astronomer Royal of Great Britain. Flamsteed House, Greenwich Park, S.E. 10, England.	1942
Keith, Sir Arthur, Kt., F.R.S., M.D., D.Sc., F.R.C.S., LL.D. Anthropologist, Master, Buckston Browne Research Farm, Downe, Farnborough, Kent, England.	1931
Kenyon, Sir Frederic George, M.A., D.Litt., LL.D., L.H.D., Ph.D. Archaeologist and Philologist, Secretary, British Academy; Formerly President, London Society of Antiquaries; Formerly Director, British Museum. Kirkstead, Godstone, Surrey, England.	1937
Kramers, Hendrik Anthony, Dr. Professor of Theoretical Physics, University of Leiden, Leiden, Netherlands.	1942
Krogh, August, Ph.D., LL.D., M.D., Sc.D. Professor of Zoophysiology, Copenhagen University, Copenhagen, Denmark.	1941
Lemaitre, Georges, D.Sc., Ph.D. Professor of Mathematics, University of Louvain. 9 rue Henry de Braekleer, Brussels, Belgium.	1945
de Margerie, Emmanuel Geologist, Formerly President, Geological Society of France. 110 Rue du Bac, Paris VII, France.	1932
Méndez-Pereira, Octavio, Ph.D., LL.D. Formerly Rector, University of Panama; Apartado 320, Panamá, Republica de Panamá.	1942
Menéndez Pidal, Ramón, Dr. honoris causa Professor of Romance Philology, University of Madrid, Madrid, Spain.	1940
Nilsson, Martin P., Ph.D. Professor of Classical Archaeology and Ancient History, University of Lund. Bredgatan 25, Lund, Sweden.	1939
Rappard, William E., Dr.jur., Litt.D., LL.D. Professor of Public Finance and Political Science, University of Geneva; Director, Graduate Institute of International Studies, Geneva, Switzerland.	1941

	Date of Election
Richardson, Sir Owen Willans, Kt., M.A., D.Sc., LL.D., F.R.S.	1910
Physicist, Yarrow Research Professor of the Royal Society; Director of Research in Physics, Kings College, London. Chandos Lodge, Alton, Hants, England.	
Rist, Charles, LL.D.	1938
Professor of Political Economy, University of Paris. 18 bis, Rue du Parc de Clagny, Versailles, France.	
Robinson, Sir Robert, Kt., F.R.S., D.Sc., LL.D.	1944
Waynflete Professor of Chemistry, Oxford University. Dyson Perrins Laboratory, South Parks Road, Oxford, England.	
Ross, Sir William David, K.B.E., O.B.E., D.Litt., LL.D., L.H.D.	1947
Philosopher and Classical Scholar. 17 Bradmore Road, Oxford, England.	
Svedberg, Theodor, Ph.D.	1941
Professor of Physical Chemistry, Upsala University, Upsala, Sweden.	
Tarn, William Woodthorpe, Litt.D., F.B.A., LL.D.	1947
Historian. Muirtown, Inverness, Scotland.	
Tawney, Richard Henry	1942
Professor of Economic History, University of London, London, England.	
Thompson, Sir D'Arcy Wentworth, D.Litt., D.Sc., LL.D.	1941
Professor of Natural History; St. Andrews University, St. Andrews, Scotland.	
Toynbee, Arnold Joseph, D.Litt.	1941
Director of Studies, Royal Institute of International Affairs; Research Professor of International History, University of London, London, England.	
Venturi, Lionello	1947
Professor of the History of Art, University of Rome, Rome, Italy.	
Vinogradov, Ivan Matveitch, Dr.	1942
Director, Steklov Institute of Mathematics of the Academy of Sciences of the U.S.S.R., Moscow, U.S.S.R.	
Wace, Alan J. B., M.A., Litt.D., LL.D., F.B.A.	1945
Professor Emeritus of Classical Archaeology, Cambridge University; Professor of Classics and Archaeology, Faruk I University, Alexandria, Egypt.	

	Date of Election
Whittaker, Edmund Taylor, LL.D., Sc.D. Professor of Mathematics, Edinburgh University. 48 George Square, Edinburgh 8, Scotland.	1944
Wilkins, Sir Hubert, Kt., M.C., F.R.G.S., M.B.O.U. Geographer. 37 West 53rd St., New York 19, N. Y.	1930
van Zeeland, Paul Formerly Prime Minister and Minister of Foreign Affairs and of Foreign Commerce of Belgium. Co-ordinating Foundation, 30 Rockefeller Plaza, New York 20, N. Y.	1942

Total Foreign Members—60.

December 31, 1947.

CLASSIFIED LIST OF MEMBERS

CLASS I. MATHEMATICAL AND PHYSICAL SCIENCES

Mathematics

Alexander, James W.....	Princeton, N. J.
Alexandroff, Paul.....	Moscow, U.S.S.R.
Bell, Eric Temple.....	Pasadena, Calif.
Bliss, Gilbert Ames.....	Chicago, Ill.
Bohr, Harald.....	Copenhagen, Denmark
Brouwer, Luitzen Egbertus Jan.....	Amsterdam, Netherlands
Coble, Arthur Byron.....	Haverford, Pa.
Dirac, Paul Adrien Maurice.....	Cambridge, England
Dresden, Arnold.....	Swarthmore, Pa.
Eisenhart, Luther Pfahler.....	Princeton, N. J.
Evans, Griffith Conrad.....	Berkeley, Calif.
Fisher, Ronald Aylmer.....	Harpenden, Hertfordshire, England
García, Godofredo.....	Lima, Peru
Huntington, Edward Vermilye.....	Cambridge, Mass.
Kline, John Robert.....	Philadelphia, Pa.
Lefschetz, Solomon.....	Princeton, N. J.
Lemaitre, Georges.....	Brussels, Belgium
Lovett, Edgar Odell.....	Houston, Texas
Morse, Marston.....	Princeton, N. J.
Murnaghan, Francis Dominic.....	Baltimore, Md.
Neugebauer, O. E.....	Providence, R. I.
von Neumann, John.....	Princeton, N. J.
Stone, Marshall Harvey.....	Chicago, Ill.
Veblen, Oswald.....	Princeton, N. J.
Vinogradov, Ivan M.....	Moscow, Russia
Weaver, Warren.....	New York, N. Y.
Weyl, Hermann.....	Princeton, N. J.
Whitney, Hassler.....	Cambridge, Mass.
Whittaker, Edmund Taylor.....	Edinburgh, Scotland

Astronomy

Abbot, Charles Greeley.....	Washington, D. C.
Adams, Walter Sydney.....	Pasadena, Calif.
Aitken, Robert Grant.....	Berkeley, Calif.
Chandrasekhar, Subrahmanyan.....	Williams Bay, Wis.

Douglass, Andrew Ellicott.....Tucson, Ariz.
 Gaposchkin, Cecilia Payne.....Cambridge, Mass.
 Hertzsprung, Ejnar.....Leiden, Netherlands
 Hubble, Edwin P.....Pasadena, Calif.
 Jones, Harold Spencer.....Greenwich Park, England
 Lampland, Carl O.....Flagstaff, Ariz.
 Leuschner, Armin Otto.....Berkeley, Calif.
 McMath, Robert Reynolds.....Pontiac, Mich.
 Menzel, Donald Howard.....Cambridge, Mass.
 Merrill, Paul Willard.....Pasadena, Calif.
 Mitchell, Samuel Alfred.....University, Va.
 Moulton, Forest Ray.....Washington, D. C.
 Olivier, Charles P.....Upper Darby, Pa.
 Russell, Henry Norris.....Princeton, N. J.
 Seares, Frederick Hanley.....Pasadena, Calif.
 Shapley, Harlow.....Cambridge, Mass.
 Slipper, Vesto Melvin.....Flagstaff, Ariz.
 Stebbins, Joel.....Madison, Wis.
 Struve, Otto.....Williams Bay, Wis.
 Tucker, Richard Hawley.....Palo Alto, Calif.
 Wright, William Hammond.....Mt. Hamilton, Calif.

Physics

Adams, Edwin Plimpton.....Princeton, N. J.
 Anderson, Carl David.....Pasadena, Calif.
 Beams, Jesse Wakefield.....University, Va.
 Bethe, Hans A.....Ithaca, N. Y.
 Birge, Raymond Thayer.....Berkeley, Calif.
 Bohr, Niels Henrik David.....Copenhagen, Denmark
 Bowen, Ira Sprague.....Pasadena, Calif.
 Bragg, William Lawrence.....Cambridge, England
 Bridgman, Percy Williams.....Cambridge, Mass.
 Briggs, Lyman J.....Washington, D. C.
 de Broglie, Louis Victor.....Neuilly-sur-Seine, France
 Buckley, Oliver Ellsworth.....New York, N. Y.
 Compton, Arthur Holly.....St. Louis, Mo.
 Compton, Karl Taylor.....Cambridge, Mass.
 Coolidge, William David.....Schenectady, N. Y.
 Crew, Henry.....Evanston, Ill.
 Darrow, Karl Kelchner.....New York, N. Y.
 Davisson, Clinton J.....Charlottesville, Va.
 Debye, Peter.....Ithaca, N. Y.
 Dempster, Arthur Jeffrey.....Chicago, Ill.

DuBridge, Lee Alvin.....	Pasadena, Calif.
Einstein, Albert.....	Princeton, N. J.
Fermi, Enrico.....	Chicago, Ill.
Foote, Paul Darwin.....	Pittsburgh, Pa.
Franck, James.....	Chicago, Ill.
Heisenberg, Werner.....	Leipzig, Germany
Humphreys, William Jackson.....	Washington, D. C.
Ives, Herbert E.....	Montclair, N. J.
Kramers, Hendrik A.....	Leiden, Netherlands
Lawrence, Ernest Orlando.....	Berkeley, Calif.
Loomis, Alfred Lee.....	Tuxedo Park, N. Y.
Lyman, Theodore.....	Cambridge, Mass.
Millikan, Robert Andrews.....	Pasadena, Calif.
Mulliken, Robert Sanderson.....	Chicago, Ill.
Oppenheimer, J. Robert.....	Princeton, N. J.
Pegram, George Braxton.....	New York, N. Y.
Rabi, Isidor Isaac.....	New York, N. Y.
Richardson, Owen Willans.....	Alton, Hants, England
Robertson, Howard Percy.....	Pasadena, Calif.
Rossby, Carl-Gustaf A.....	Chicago, Ill.
See, Thomas Jefferson Jackson.....	Vallejo, Calif.
Seitz, Frederick, Jr.....	Pittsburgh, Pa.
Slater, John Clarke.....	Cambridge, Mass.
Smyth, Henry DeWolf.....	Princeton, N. J.
Stone, Otto.....	Berkeley, Calif.
Swann, William Francis Gray.....	Swarthmore, Pa.
Tate, John Torrence.....	Minneapolis, Minn.
Tolman, Richard Chace.....	Pasadena, Calif.
Tuve, Merle Antony.....	Washington, D. C.
Van Vleck, John Hasbrouck.....	Cambridge, Mass.
Webster, David Locke.....	Stanford University, Calif.
Wigner, Eugene Paul.....	Princeton, N. J.
Wilson, Harold Albert.....	Houston, Texas
Zeleny, John.....	New Haven, Conn.

Chemistry

Adams, Roger.....	Urbana, Ill.
Andrews, Donald Hatch.....	Baltimore, Md.
Bancroft, Wilder Dwight.....	Ithaca, N. Y.
Bogert, Marston Taylor.....	New York, N. Y.
Clark, William Mansfield.....	Baltimore, Md.
Clarke, Hans Thacher.....	New York, N. Y.
Conant, James Bryant.....	Cambridge, Mass.
Cottrell, Frederick Gardner.....	Palo Alto, Calif.

Du Pont, Pierre Samuel.....	Wilmington, Del.
Eyring, Henry.....	Salt Lake City, Utah
Fieser, Louis Frederick.....	Belmont, Mass.
Giauque, William Francis.....	Berkeley, Calif.
Harkins, William Draper.....	Chicago, Ill.
Hawk, Philip Bovier.....	New York, N. Y.
Hopkins, B. Smith.....	Urbana, Ill.
Hulett, George A.....	Princeton, N. J.
Irvine, James Colquhoun.....	Fifeshire, Scotland
Johnston, John.....	Southwest Harbor, Me.
Keyes, Frederick George.....	Cambridge, Mass.
Kirkwood, John Gamble.....	Pasadena, Calif.
Kistiakowsky, George Bogdan.....	Cambridge, Mass.
Kraus, Charles August.....	Providence, R. I.
Lamb, Arthur Becket.....	Cambridge, Mass.
Langmuir, Irving.....	Schenectady, N. Y.
Lind, Samuel Colville.....	Minneapolis, Minn.
MacInnes, Duncan Arthur.....	New York, N. Y.
Marvel, Carl Shipp.....	Urbana, Ill.
Mees, Charles Edward Kenneth.....	Rochester, N. Y.
Northrop, John Howard.....	Princeton, N. J.
Noyes, William Albert, Jr.....	Rochester, N. Y.
Patterson, Lamar Gray.....	Perdido Beach, Ala.
Pauling, Linus Carl.....	Pasadena, Calif.
Robinson, Robert.....	Oxford, England
Smyth, Charles Phelps.....	Princeton, N. J.
Stanley, Wendell Meredith.....	Princeton, N. J.
Svedberg, Theodor.....	Upsala, Sweden
Taylor, Hugh Stott.....	Princeton, N. J.
Urey, Harold Clayton.....	Chicago, Ill.
Van Slyke, Donald Dexter.....	New York, N. Y.
du Vigneaud, Vincent.....	New York, N. Y.
Whitney, Willis R.....	Schenectady, N. Y.
Williams, Robert R.....	Summit, N. J.
Wilson, Edgar Bright, Jr.....	Cambridge, Mass.

Engineering

Bush, Vannevar.....	Washington, D. C.
Davis, Harvey N.....	Hoboken, N. J.
Derleth, Charles, Jr.....	Berkeley, Calif.
Dewey, Bradley.....	Cambridge, Mass.
Dunn, Gano.....	New York, N. Y.
Durand, William Frederick.....	Stanford University, Calif.
Hoover, Herbert.....	Stanford University, Calif.

Hunsaker, Jerome Clarke.....	Cambridge, Mass.
Jackson, Dugald Caleb.....	Cambridge, Mass.
Jewett, Frank Baldwin.....	New York, N. Y.
Kármán, Theodor von.....	Pasadena, Calif.
Kettering, Charles Franklin.....	Dayton, Ohio
Lewis, George William.....	Chevy Chase, Md.
Pender, Harold.....	Philadelphia, Pa.
Timoshenko, Stephen P.....	Palo Alto, Calif.
Westergaard, Harald Malcolm.....	Cambridge, Mass.
Yeatman, Pope.....	New York, N. Y.

CLASS II. GEOLOGICAL AND BIOLOGICAL SCIENCES

Geology, Paleontology, Geography, Oceanography

Berkey, Charles Peter.....	New York, N. Y.
Blackwelder, Eliot.....	Stanford University, Calif.
Bowen, Norman L.....	Washington, D. C.
Bowman, Isaiah.....	Baltimore, Md.
Buddington, Arthur F.....	Princeton, N. J.
Byrd, Richard Evelyn.....	Boston, Mass.
Case, Ermine Cowles.....	Ann Arbor, Mich.
†Chamberlin, Rollin Thomas.....	Chicago, Ill.
Chaney, Ralph Works.....	Berkeley, Calif.
Cross, Whitman.....	Chevy Chase, Md.
Daly, Reginald Aldworth.....	Cambridge, Mass.
Day, Arthur L.....	Bethesda, Md.
Dunbar, Carl Owen.....	New Haven, Conn.
Gregory, Herbert Ernest.....	Honolulu, Hawaii
Gregory, William King.....	New York, N. Y.
Hobbs, William Herbert.....	Ann Arbor, Mich.
Lawson, Andrew Cowper.....	Berkeley, Calif.
Leith, Charles Kenneth.....	Madison, Wis.
de Margerie, Emmanuel.....	Paris, France
Sauer, Carl O.....	Berkeley, Calif.
Simpson, George Gaylord.....	New York, N. Y.
Stefansson, Vilhjalmur.....	New York, N. Y.
Stock, Chester.....	Pasadena, Calif.
Sverdrup, Harald Ulrik.....	La Jolla, Calif.
Vaughan, Thomas Wayland.....	Washington, D. C.
Warren, Charles Hyde.....	Litchfield, Conn.

†Deceased.

Wilkins, Hubert.....New York, N. Y.
 Willis, Bailey.....Stanford University, Calif.
 Wright, Frederick E.....Washington, D. C.

Zoology, Anatomy

Andrews, Roy Chapman.....Colebrook, Conn.
 Bigelow, Henry Bryant.....Cambridge, Mass.
 Birge, Edward Asahel.....Madison, Wis.
 Calvert, Philip Powell.....Cheyney, Pa.
 Castle, William Ernest.....Berkeley, Calif.
 †Cockerell, Theodore D. A.....Boulder, Colo.
 Conklin, Edwin Grant.....Princeton, N. J.
 Corner, George Washington.....Baltimore, Md.
 Danforth, Charles Haskell.....Stanford University, Calif.
 Detwiler, Samuel Randall.....New York, N. Y.
 Dobzhansky, Theodosius.....New York, N. Y.
 Dunn, Leslie Clarence.....New York, N. Y.
 Harrison, Ross G.....New Haven, Conn.
 Hisaw, Frederick Lee.....Cambridge, Mass.
 Hjort, Johan.....Oslo, Norway
 Howard, Leland Ossian.....Washington, D. C.
 Lewis, Warren Harmon.....Philadelphia, Pa.
 McClure, Charles F. W.....Princeton, N. J.
 McGregor, James Howard.....New York, N. Y.
 Metz, Charles William.....Philadelphia, Pa.
 Miller, Gerrit Smith, Jr.....Washington, D. C.
 Moore, J. Percy.....Philadelphia, Pa.
 Muller, Hermann Joseph.....Bloomington, Ind.
 Murphy, Robert Cushman.....New York, N. Y.
 Nicholas, John Spangler.....New Haven, Conn.
 Painter, Theophilus Shickel.....Austin, Texas
 Parker, George Howard.....Cambridge, Mass.
 Ruthven, Alexander G.....Ann Arbor, Mich.
 Schaeffer, J. Parsons.....Philadelphia, Pa.
 Schultz, Adolph H.....Baltimore, Md.
 Streeter, George Linius.....Baltimore, Md.
 Sturtevant, Alfred Henry.....Pasadena, Calif.
 Taliaferro, William Hay.....Chicago, Ill.
 Thompson, D'Arcy Wentworth.....St. Andrews, Scotland
 Weed, Lewis Hill.....Baltimore, Md.
 Wetmore, Alexander.....Washington, D. C.
 Wright, Sewall.....Chicago, Ill.

†Deceased.

Botany, Bacteriology

Allen, Charles Elmer.....	Madison, Wis.
Bailey, Irving Widmer.....	Cambridge, Mass.
Bailey, Liberty Hyde.....	Ithaca, N. Y.
Bartlett, Harley Harris.....	Ann Arbor, Mich.
Bayne-Jones, Stanhope.....	New Haven, Conn.
Beadle, George Wells.....	Pasadena, Calif.
Blakeslee, Albert Francis.....	Northampton, Mass.
Campbell, Douglas Houghton.....	Stanford University, Calif.
Cleland, Ralph Erskine.....	Bloomington, Ind.
Crocker, William.....	Yonkers, N. Y.
Davis, Bradley Moore.....	Ann Arbor, Mich.
Duggar, Benjamin Minge.....	Pearl River, N. Y.
Fernald, Merritt Lyndon.....	Cambridge, Mass.
Fred, Edwin Broun.....	Madison, Wis.
Kunkel, Louis Otto.....	Princeton, N. J.
†Livingston, Burton E.....	Riderwood, Md.
McClintock, Barbara.....	Cold Spring Harbor, L.I., N. Y.
McCollum, Elmer V.....	Baltimore, Md.
MacDougal, Daniel Trembly.....	Carmel, Calif.
Merrill, Elmer Drew.....	Jamaica Plain, Mass.
Moore, George Thomas.....	St. Louis, Mo.
Novy, Frederick G.....	Ann Arbor, Mich.
Robbins, William Jacob.....	New York, N. Y.
Schramm, Jacob Richard.....	Philadelphia, Pa.
Shull, George Harrison.....	Princeton, N. J.
Sinnott, Edmund Ware.....	New Haven, Conn.
Spoehr, Herman Augustus.....	Stanford University, Calif.
Stadler, Lewis John.....	Columbia, Mo.
Stakman, Elvin Charles.....	St. Paul, Minn.

Anthropology, Psychology

Angell, James Rowland.....	New Haven, Conn.
Bartlett, Frederic Charles.....	Cambridge, England
Boring, Edwin Garrigues.....	Cambridge, Mass.
Carmichael, Leonard.....	Medford, Mass.
Cole, Fay-Cooper.....	Chicago, Ill.
Hooton, Earnest A.....	Cambridge, Mass.
Hunter, Walter Samuel.....	Providence, R. I.
Keith, Arthur.....	Farnborough, Kent, England
Köhler, Wolfgang.....	Swarthmore, Pa.
Lashley, Karl Spencer.....	Orange Park, Fla.

†Deceased.

Miles, Walter Richard.....New Haven, Conn.
 Redfield, Robert.....Chicago, Ill.
 Spier, Leslie.....Santa Cruz, Calif.
 Thorndike, Edward L.....New York, N. Y.
 Tolman, Edward Chace.....Berkeley, Calif.
 Tozzer, Alfred Marston.....Cambridge, Mass.
 Witmer, Lightner.....Devon, Pa.
 Woodworth, Robert Sessions.....New York, N. Y.
 Yerkes, Robert Mearns.....New Haven, Conn.

Physiology, Pathology

Adrian, Edgar Douglas.....Cambridge, England
 Benedict, Francis Gano.....Machiasport, Maine
 Bronk, Detlev W.....Philadelphia, Pa.
 Carlson, Anton Julius.....Chicago, Ill.
 Dale, Henry Hallett.....London, England
 Doisy, Edward Adelbert.....Webster Groves, Mo.
 DuBois, Eugene Floyd.....New York, N. Y.
 Erlanger, Joseph.....St. Louis, Mo.
 Elvehjem, Conrad Arnold.....Madison, Wis.
 Fenn, Wallace Osgood.....Rochester, N. Y.
 Forbes, Alexander.....Boston, Mass.
 Gasser, Herbert Spencer.....New York, N. Y.
 Gies, William J.....New York, N. Y.
 Goodpasture, Ernest William.....Nashville, Tenn.
 Harvey, E. Newton.....Princeton, N. J.
 Hastings, A. Baird.....Boston, Mass.
 Hill, Archibald Vivian.....London, England
 Houssay, Bernardo Alberto.....Buenos Aires, Argentina
 Jacobs, Merkel Henry.....Philadelphia, Pa.
 Krogh, August.....Copenhagen, Denmark
 Lillie, Ralph Stayner.....Chicago, Ill.
 Loeb, Leo.....St. Louis, Mo.
 Long, Esmond Ray.....Philadelphia, Pa.
 Murlin, John Raymond.....Rochester, N. Y.
 Osterhout, Winthrop J. V.....New York, N. Y.
 Richards, Alfred Newton.....Bryn Mawr, Pa.
 Riddle, Oscar.....Plant City, Fla.
 Shope, Richard Edwin.....Princeton, N. J.
 Tyzzer, Ernest Edward.....Wakefield, Mass.
 Whipple, George Hoyt.....Rochester, N. Y.

Medicine, Pharmacology, Surgery

Castle, William Bosworth.....	Boston, Mass.
Cori, Carl Ferdinand.....	St. Louis, Mo.
Darrach, William.....	New York, N. Y.
Graham, Evarts Ambrose.....	St. Louis, Mo.
Gregg, Alan.....	Scarsdale, N. Y.
Heiser, Victor George.....	Bantam, Conn.
Joslin, Elliott Proctor.....	Boston, Mass.
MacNider, William de Berniere.....	Chapel Hill, N. C.
Minot, George Richards.....	Boston, Mass.
Norris, George William.....	Dimock, Pa.
Packard, Francis Randolph.....	Philadelphia, Pa.
Pepper, O. H. Perry.....	Ithaca, Pa.
Rivers, Thomas Milton.....	Forest Hills, L. I., N. Y.
Rous, Peyton.....	New York, N. Y.
Stadie, William Christopher.....	Philadelphia, Pa.

CLASS III. SOCIAL SCIENCES

Economics, Statistics, Sociology

Barnard, Chester Irving.....	Newark, N. J.
Bonbright, James Cummings.....	New York, N. Y.
Burns, Arthur Frank.....	New York, N. Y.
Clark, John Maurice.....	Westport, Conn.
Clay, Henry.....	Oxford, England
Day, Edmund Ezra.....	Ithaca, N. Y.
Einaudi, Luigi.....	Turin, Italy
Fetter, Frank Albert.....	Princeton, N. J.
Goodrich, Carter.....	New York, N. Y.
Heaton, Herbert.....	Minneapolis, Minn.
Heckscher, Eli Filip.....	Stockholm, Sweden
Huebner, Solomon Stephen.....	Merion, Pa.
Johnson, Alvin Saunders.....	Nyack, N. Y.
Johnson, Emory R.....	Philadelphia, Pa.
Lippmann, Walter.....	Washington, D. C.
MacIver, Robert Morrison.....	Palisades, N. Y.
Mitchell, Wesley Clair.....	New York, N. Y.
Moulton, Harold Glenn.....	Washington, D. C.
Notestein, Frank W.....	Princeton, N. J.
Ogburn, William Fielding.....	Chicago, Ill.
Patterson, Ernest Minor.....	Philadelphia, Pa.
Rappard, William E.....	Geneva, Switzerland
Rist, Charles.....	Versailles, France

Slichter, Sumner Huber.....	Cambridge, Mass.
Stewart, Walter W.....	Princeton, N. J.
Sprague, Oliver M. W.....	Boston, Mass.
Tawney, Richard Henry.....	London, England
Viner, Jacob.....	Princeton, N. J.
Williams, John Henry.....	Cambridge, Mass.
Willits, Joseph Henry.....	New York, N. Y.
Wilson, Edwin Bidwell.....	Brookline, Mass.
Wolman, Leo.....	New York, N. Y.
Young, Donald Ramsey.....	New York, N. Y.
Young, James Thomas.....	Philadelphia, Pa.

Modern History

Adams, James Truslow.....	Southport, Conn.
Armstrong, Hamilton Fish.....	New York, N. Y.
Beard, Charles Austin.....	New Milford, Conn.
Bolton, Herbert Eugene.....	Berkeley, Calif.
Boyd, Julian Parks.....	Princeton, N. J.
Croce, Benedetto.....	Naples, Italy
Fay, Sidney Bradshaw.....	Cambridge, Mass.
Ford, Guy Stanton.....	Washington, D. C.
Freeman, Douglas Southall.....	Richmond, Va.
Gooch, George Peabody.....	London, England
Hayes, Carlton Joseph Huntley.....	New York, N. Y.
Langer, William Leonard.....	Cambridge, Mass.
Lingelbach, William E.....	Philadelphia, Pa.
McIlwain, Charles Howard.....	Princeton, N. J.
Morison, Samuel Eliot.....	Canton, Mass.
Nichols, Roy Franklin.....	Swarthmore, Pa.
Read, Conyers.....	Villa, Nova, Pa.
Schlesinger, Arthur Meier.....	Cambridge, Mass.
Schmitt, Bernadotte Everly.....	Alexandria, Va.
Schuyler, Robert Livingston.....	New York, N. Y.
Seymour, Charles.....	New Haven, Conn.
Shotwell, James Thomson.....	New York, N. Y.
Shryock, Richard Harrison.....	Merion, Pa.
Sioussat, St. George Leakin.....	Chevy Chase, Md.
Wertenbaker, Thomas Jefferson.....	Williamsburg, Va.

Jurisprudence

Carr, Cecil Thomas.....	London, England
Chafee, Zechariah, Jr.....	Cambridge, Mass.
Chamberlain, Joseph Perkins.....	New York, N. Y.
Corwin, Edward Samuel.....	Princeton, N. J.

Davis, John William.....	New York, N. Y.
Dickinson, John.....	Philadelphia, Pa.
Duane, Morris.....	Philadelphia, Pa.
Frankfurter, Felix.....	Washington, D. C.
Goodrich, Herbert Funk.....	Philadelphia, Pa.
Hudson, Manley Ottmer.....	Cambridge, Mass.
Hughes, Charles Evans.....	Washington, D. C.
Jessup, Philip C.....	New York, N. Y.
Kelley, Nicholas.....	New York, N. Y.
Landis, James McCauley.....	Washington, D. C.
Lewis, Edwin Owen.....	Philadelphia, Pa.
Miller, Hunter.....	Victoria, B. C., Canada
Moe, Henry Allen.....	New York, N. Y.
Pepper, George Wharton.....	Philadelphia, Pa.
Pound, Roscoe.....	Watertown, Mass.
Roberts, Owen J.....	Birchrunville, Pa.
Rogers, Lindsay.....	New York, N. Y.
Warren, Charles.....	Washington, D. C.
Wilson, George Grafton.....	Cambridge, Mass.
Wright, Quincy.....	Chicago, Ill.

Administration, Government

Beneš, Eduard.....	Prague, Czechoslovakia
Crane, Robert Treat.....	Stonington, Conn.
Delano, Frederic Adrian.....	Washington, D. C.
Dodds, Harold Willis.....	Princeton, N. J.
Fosdick, Raymond Blaine.....	New York, N. Y.
Gifford, Walter Sherman.....	New York, N. Y.
Lattimore, Owen.....	Baltimore, Md.
McClelland, George William.....	Philadelphia, Pa.
Marshall, George Catlett.....	Washington, D. C.
Merriam, Charles Edward.....	Chicago, Ill.
Putnam, Herbert.....	Washington, D. C.
Rockefeller, John D., Jr.....	New York, N. Y.
Wallace, Henry Agard.....	New York, N. Y.
Young, Owen D.....	New York, N. Y.
van Zeeland, Paul.....	New York, N. Y.

Affairs

Burgess, Warren Randolph.....	New York, N. Y.
Douglas, Lewis Williams.....	New York, N. Y.
Fels, Samuel S.....	Philadelphia, Pa.
Hopkinson, Edward, Jr.....	Philadelphia, Pa.
Jenkins, Charles Francis.....	Philadelphia, Pa.

†Lamont, Thomas William.....	New York, N. Y.
Leeds, Morris Evans.....	Philadelphia, Pa.
Mason, William Smith.....	Pasadena, Calif.
Morgan, Marshall S.....	Philadelphia, Pa.
Morris, Lawrence J.....	Philadelphia, Pa.
Rhoads, Charles James.....	Bryn Mawr, Pa.
Rosenwald, Lessing J.....	Jenkintown, Pa.
Scattergood, J. Henry.....	Villa Nova, Pa.
Wetherill, Samuel Price.....	Philadelphia, Pa.

CLASS IV. HUMANITIES

Philosophy, Education

Dewey, John.....	New York, N. Y.
Gates, Thomas Sovereign.....	Philadelphia, Pa.
Graves, Frank Pierrepont.....	Albany, N. Y.
Haney, John Louis.....	Philadelphia, Pa.
Hocking, William Ernest.....	Madison, N. H.
Hu Shih.....	New York, N. Y.
Lewis, Clarence Irving.....	Lexington, Mass.
Lovejoy, Arthur Oncken.....	Baltimore, Md.
Niebuhr, Reinhold.....	New York, N. Y.
Perry, Ralph Barton.....	Cambridge, Mass.
Ross, William David.....	Oxford, England
Singer, Edgar Arthur, Jr.....	Philadelphia, Pa.

Ancient, Medieval, and Cultural History

Bell, Harold Idris.....	London, England
Blake, Robert Pierpont.....	Cambridge, Mass.
Chinard, Gilbert.....	Princeton, N. J.
De Sanctis, Gaetano.....	Rome, Italy
Ferguson, William Scott.....	Cambridge, Mass.
Leland, Waldo G.....	Washington, D. C.
Lowie, Robert H.....	Berkeley, Calif.
Nock, Arthur Darby.....	Cambridge, Mass.
Rostovtzeff, Michael I.....	New Haven, Conn.
Sarton, George.....	Cambridge, Mass.
Sigerist, Henry Ernest.....	Ticino, Switzerland
Tarn, William Woodthorpe.....	Inverness, Scotland
Thorndike, Lynn.....	New York, N. Y.
Westermann, William Linn.....	Scarsdale, N. Y.

†Deceased.

Archaeology, History of Art, and Architecture

Albright, William F.....	Baltimore, Md.
Beazley, John Davidson.....	Oxford, England
Blegen, Carl William.....	Cincinnati, Ohio
Carpenter, Rhys.....	Downingtown, Pa.
Chase, George Henry.....	Cambridge, Mass.
Cook, Arthur Bernard.....	Cambridge, England
Dinsmoor, William Bell.....	New York, N. Y.
Gardiner, Alan Henderson.....	London, England
Holland, Leicester Bodine.....	Philadelphia, Pa.
Jayne, Horace Howard Furness.....	New York, N. Y.
Kenyon, Frederic George.....	Godstone, Surrey, England
Kidder, Alfred Vincent.....	Cambridge, Mass.
Kimball, Fiske.....	Philadelphia, Pa.
Kroeber, Alfred Louis.....	Berkeley, Calif.
Meritt, Benjamin Dean.....	Princeton, N. J.
Morley, Sylvanus Griswold.....	Merida, Yucatan, Mexico
Nilsson, Martin P.....	Lund, Sweden
Richter, Gisela M. A.....	New York, N. Y.
Robinson, David Moore.....	Baltimore, Md.
Swindler, Mary Hamilton.....	Bryn Mawr, Pa.
Taylor, Francis Henry.....	New York, N. Y.
Venturi, Lionello.....	Rome, Italy
Wace, Alan J. B.....	Alexandria, Egypt
Winlock, Herbert Eustis.....	New York, N. Y.

Languages and Literary History

Alonso, Amado.....	Buenos Aires, Argentina
Baugh, Albert Croll.....	Philadelphia, Pa.
Beeson, Charles Henry.....	Chicago, Ill.
Bloomfield, Leonard.....	New Haven, Conn.
Bonner, Campbell.....	Ann Arbor, Mich.
Brown, W. Norman.....	Philadelphia, Pa.
Buck, Carl Darling.....	Chicago, Ill.
Capps, Edward.....	Princeton, N. J.
Craigie, William A.....	Oxford, England
Edgerton, Franklin.....	New Haven, Conn.
Gulick, Charles Burton.....	Cambridge, Mass.
Hendrickson, George Lincoln.....	New Haven, Conn.
Jaeger, Werner Wilhelm.....	Watertown, Mass.
Keniston, Hayward.....	Ann Arbor, Mich.
Lancaster, Henry Carrington.....	Baltimore, Md.
McDaniel, Walton Brooks.....	Coconut Grove, Fla.

Malone, Kemp.....Baltimore, Md.
 Méndez-Pereira, Octavio.....Panama City, Panama
 Menéndez Pidal, Ramón.....Madrid, Spain
 Montgomery, James Alan.....Philadelphia, Pa.
 Nitze, William Albert.....Los Angeles, Calif.
 Notestein, Wallace.....New Haven, Conn.
 Osgood, Charles Grosvenor.....Princeton, N. J.
 Robinson, Fred Norris.....Cambridge, Mass.
 Sanders, Henry A.....Ann Arbor, Mich.
 Speiser, Ephraim Avigdor.....Philadelphia, Pa.
 Sturtevant, Edgar Howard.....New Haven, Conn.
 Tatlock, John S. P.....Northampton, Mass.
 Taylor, Lily Ross.....Bryn Mawr, Pa.
 Thompson, Stith.....Bloomington, Ind.
 Toynbee, Arnold Joseph.....London, England

Letters and Fine Arts

Aydelotte, Frank.....Princeton, N. J.
 Brooks, Van Wyck.....New York, N. Y.
 Bush, John Nash Douglas.....Cambridge, Mass.
 Cross, Wilbur L.....New Haven, Conn.
 Damrosch, Walter Johannes.....New York, N. Y.
 Frost, Robert.....South Shaftsbury, Vt.
 Greg, Walter Wilson.....Petworth, Sussex, England
 Jones, Howard Mumford.....Cambridge, Mass.
 Lydenberg, Harry Miller.....Greensboro, N. C.
 Mann, Thomas.....Palisades, Calif.
 Mather, Frank Jewett, Jr.....Princeton, N. J.
 Morey, Charles Rufus.....Princeton, N. J.
 Morris, Harrison Smith.....Philadelphia, Pa.
 Mumford, Lewis.....Amenia, N. Y.
 Nicolson, Marjorie Hope.....New York, N. Y.
 O'Neill, Eugene Gladstone.....New York, N. Y.
 Panofsky, Erwin.....Princeton, N. J.
 Post, Chandler Rathfon.....Cambridge, Mass.
 Quinn, Arthur Hobson.....Bala-Cynwyd, Pa.
 Repplier, Agnes.....Philadelphia, Pa.
 Rosenbach, A. S. W.....Philadelphia, Pa.
 Sachs, Paul Joseph.....Cambridge, Mass.
 Taylor, Deems.....Stamford, Conn.
 Van Doren, Carl.....New York, N. Y.

GEOGRAPHICAL OR PROFESSIONAL LOCATIONS OF MEMBERS

RESIDENTS OF THE UNITED STATES

Alabama

PERDIDO BEACH

Patterson, Lamar Gray

Arizona

FLAGSTAFF

Lampland, Carl O.

Slipher, Vesto Melvin

TUCSON

Douglass, Andrew Ellicott

California

BERKELEY

Aitken, Robert Grant

Birge, Raymond Thayer

Bolton, Herbert Eugene

Castle, William Ernest

Chaney, Ralph Works

Derleth, Charles, Jr.

Evans, Griffith Conrad

Giauque, William Francis

Kroeber, Alfred Louis

Lawrence, Ernest Orlando

Lawson, Andrew Cowper

Leuschner, Armin Otto

Lowie, Robert H.

Sauer, Carl O.

Stern, Otto

Tolman, Edward Chace

CARMEL

MacDougal, Daniel Trembly

LA JOLLA

Sverdrup, Harald Ulrik

LOS ANGELES

Nitze, William Albert

MT. HAMILTON

Wright, William Hammond

PALISADES

Mann, Thomas

PALO ALTO

Cottrell, Frederick Gardner

Tucker, Richard Hawley

PASADENA

Adams, Walter Sydney

Anderson, Carl David

Beadle, George Wells

Bell, Eric Temple

Bowen, Ira Sprague

DuBridge, Lee A.

Hubble, Edwin P.

Kármán, Theodor von

Kirkwood, John Gamble

Mason, William Smith

Merrill, Paul Willard

Millikan, Robert Andrews

- Pauling, Linus Carl
 Robertson, Howard Percy
 Seares, Frederick Hanley
 Stock, Chester
 Sturtevant, Alfred Henry
 Tolman, Richard Chace
- SANTA CRUZ**
 Spier, Leslie
- STANFORD UNIVERSITY**
 Blackwelder, Eliot
 Campbell, Douglas Houghton
 Danforth, Charles Haskell
 Durand, William Frederick
 Hoover, Herbert
 Spoehr, Herman Augustus
 Timoshenko, Stephen P.
 Webster, David Locke
 Willis, Bailey
- VALLEJO**
 See, Thomas Jefferson Jackson
- Colorado**
- BOULDER**
 †Cockerell, Theodore D. A.
- Connecticut**
- BANTAM**
 Heiser, Victor George
- COLEBROOK**
 Andrews, Roy Chapman
- NEW HAVEN**
 Angell, James Rowland
 Bayne-Jones, Stanhope
 Bloomfield, Leonard
 Cross, Wilbur L.
 Dunbar, Carl O.
 Edgerton, Franklin
 Harrison, Ross G.
- Hendrickson, George Lincoln
 Miles, Walter Richard
 Nicholas, John Spangler
 Notestein, Wallace
 Rostovtzeff, Michael I.
 Seymour, Charles
 Sinnott, Edmund Ware
 Sturtevant, Edgar Howard
 Warren, Charles Hyde
 Yerkes, Robert Mearns
 Zeleny, John
- NEW MILFORD**
 Beard, Charles Austin
- SOUTHPORT**
 Adams, James Truslow
- STAMFORD**
 Taylor, Deems
- STONINGTON**
 Crane, Robert Treat
- WESTPORT**
 Clark, John Maurice
- Delaware**
- WILMINGTON**
 Du Pont, Pierre Samuel
- District of Columbia**
- WASHINGTON**
 Abbot, Charles Greeley
 Bowen, Norman L.
 Briggs, Lyman J.
 Bush, Vannevar
 Cross, Whitman
 Day, Arthur L.
 Delano, Frederic Adrian
 Ford, Guy Stanton
 Frankfurter, Felix
 Howard, Leland Ossian

†Deceased.

Hughes, Charles Evans⁴
 Humphreys, William Jackson
 Landis, James McC.
 Leland, Waldo G.
 Lewis, George William
 Lippmann, Walter
 Marshall, George Catlett
 Miller, Gerrit Smith, Jr.
 Moulton, Forest Ray
 Moulton, Harold Glenn
 Putnam, Herbert
 Sioussat, St. George L.
 Tuve, Merle Antony
 Vaughan, Thomas Wayland
 Warren, Charles
 Wetmore, Alexander
 Wright, Frederick E.

Florida

COCONUT GROVE

McDaniel, Walton Brooks

ORANGE PARK

Lashley, Karl Spencer

PLANT CITY

Riddle, Oscar

Hawaii

HONOLULU

Gregory, Herbert Ernest

Illinois

CHICAGO

Beeson, Charles Henry
 Bliss, Gilbert Ames
 Buck, Carl Darling
 Carlson, Anton Julius
 †Chamberlin, Rollin Thomas
 Cole, Fay-Cooper
 Dempster, Arthur Jeffrey
 Fermi, Enrico

†Deceased.

Franck, James
 Harkins, William Draper
 Lillie, Ralph Stayner
 Merriam, Charles Edward
 Mulliken, Robert Sanderson
 Ogburn, William Fielding
 Redfield, Robert
 Rossby, Carl-Gustaf Arvid
 Stone, Marshall Harvey
 Taliaferro, William Hay
 Urey, Harold C.
 Wright, Quincy
 Wright, Sewall

EVANSTON

Crew, Henry

URBANA

Adams, Roger
 Hopkins, B Smith
 Marvel, Carl Shipp

Indiana

BLOOMINGTON

Cleland, Ralph Erskine
 Muller, Hermann Joseph
 Thompson, Stith

Maine

MACHIASPORT

Benedict, Francis Gano

SOUTHWEST HARBOR

Johnston, John

Maryland

BALTIMORE

Albright, William F.
 Andrews, Donald Hatch
 Bowman, Isaiah
 Clark, William Mansfield
 Corner, George Washington
 Lancaster, Henry Carrington

Lattimore, Owen
 †Livingston, Burton E.
 Lovejoy, Arthur Oncken
 McCollum, Elmer Verner
 Malone, Kemp
 Murnaghan, Francis D.
 Robinson, David Moore
 Schultz, Adolph H.
 Streeter, George Linius
 Weed, Lewis H.

Massachusetts

BOSTON

Byrd, Richard Evelyn
 Castle, William Bosworth
 Forbes, Alexander
 Hastings, A. Baird
 Joslin, Elliott Proctor
 Merrill, Elmer Drew
 Minot, George Richards
 Morison, Samuel E.
 Sprague, Oliver M. W.
 Tyzzer, Ernest Edward

BROOKLINE

Wilson, Edwin Bidwell

CAMBRIDGE

Bailey, Irving Widmer
 Bigelow, Henry Bryant
 Blake, Robert Pierpont
 Boring, Edwin Garrigues
 Bridgman, Percy Williams
 Bush, John Nash Douglas
 Chafee, Zechariah, Jr.
 Chase, George Henry
 Compton, Karl Taylor
 Conant, James Bryant
 Daly, Reginald Aldworth
 Dewey, Bradley
 Fay, Sidney Bradshaw
 Ferguson, William Scott
 Fernald, Merritt Lyndon
 Fieser, Louis Frederick
 Gaposchkin, Cecelia Payne

†Deceased.

Gulick, Charles Burton
 Hisaw, Frederick Lee
 Hooton, Earnest A.
 Hudson, Manley Ottmer
 Hunsaker, Jerome Clarke
 Huntington, Edward V.
 Jackson, Dugald Caleb
 Jaeger, Werner Wilhelm
 Jones, Howard Mumford
 Keyes, Frederick George
 Kidder, Alfred Vincent
 Kistiakowsky, George B.
 Lamb, Arthur Becket
 Langer, William Leonard
 Lyman, Theodore
 Menzel, Donald Howard
 Nock, Arthur Darby
 Parker, George Howard
 Perry, Ralph Barton
 Post, Chandler Rathfon
 Pound, Roscoe
 Robinson, Fred Norris
 Sachs, Paul Joseph
 Sarton, George
 Schlesinger, Arthur Meier
 Shapley, Harlow
 Slater, John Clarke
 Slichter, Sumner Huber
 Tozzer, Alfred Marston
 Van Vleck, John Hasbrouck
 Westergaard, Harald M.
 Whitney, Hassler
 Williams, John H.
 Wilson, Edgar Bright, Jr.
 Wilson, George Grafton

LEXINGTON

Lewis, Clarence I.

MEDFORD

Carmichael, Leonard

NORTHAMPTON

Blakeslee, Albert F.
 Tatlock, J. S. P.

Michigan**ANN ARBOR**

Bartlett, Harley Harris
 Bonner, Campbell
 Case, Ermine C  wles
 Davis, Bradley Moore
 Hobbs, William Herbert
 Keniston, Hayward
 Novy, Frederick G.
 Ruthven, Alexander G.
 Sanders, Henry A.

PONTIAC

McMath, Robert R.

Minnesota**MINNEAPOLIS**

Heaton, Herbert
 Lind, Samuel Colville
 Tate, John Torrence

ST. PAUL

Stakman, Elvin Charles

Missouri**COLUMBIA**

Stadler, Lewis John

ST. LOUIS

Compton, Arthur H.
 Cori, Carl Ferdinand
 Erlanger, Joseph
 Graham, Evarts Ambrose
 Loeb, Leo
 Moore, George Thomas

WEBSTER GROVES

Doisy, Edward A.

New Hampshire**MADISON**

Hocking, William Ernest

New Jersey**HOBOKEN**

Davis, Harvey Nathaniel

NEWARK

Barnard, Chester Irving

PRINCETON

Adams, Edwin Plimpton
 Alexander, James W.
 Aydelotte, Frank
 Boyd, Julian Parks
 Buddington, Arthur F.
 Capps, Edward
 Chinard, Gilbert
 Conklin, Edwin Grant
 Corwin, Edward Samuel
 Dodds, Harold Willis
 Einstein, Albert
 Eisenhart, Luther Pfahler
 Fetter, Frank Albert
 Harvey, E. Newton
 Hulett, George A.
 Kunkel, Louis O.
 Lefschetz, Solomon
 McClure, Charles F. W.
 McIlwain, Charles Howard
 Mather, Frank Jewett, Jr.
 Meritt, Benjamin Dean
 Morey, Charles Rufus
 Morse, Marston
 von Neumann, John
 Northrop, John Howard
 Notestein, Frank W.
 Oppenheimer, J. Robert
 Osgood, Charles Grosvenor
 Panofsky, Erwin
 Russell, Henry Norris
 Shope, Richard Edwin
 Shull, George Harrison
 Smyth, Charles Phelps
 Smyth, Henry DeWolf
 Stanley, Wendell Meredith

- Stewart, Walter W.
 Taylor, Hugh Stott
 Veblen, Oswald
 Viner, Jacob
 Weyl, Hermann
 Wigner, Eugene P.
- SUMMIT
 Williams, Robert R.
- New York**
- ALBANY
 Graves, Frank Pierrepont
- AMENIA
 Mumford, Lewis
- COLD SPRING HARBOR
 McClintock, Barbara
- ITHACA
 Bailey, Liberty Hyde
 Bancroft, Wilder Dwight
 Bethe, Hans Albrecht
 Day, Edmund Ezra
 Debye, Peter
- NEW YORK
 Armstrong, Hamilton Fish
 Berkey, Charles Peter
 Bogert, Marston Taylor
 Bonbright, James Cummings
 Brooks, Van Wyck
 Buckley, Oliver E.
 Burgess, Warren R.
 Burns, Arthur Frank
 Chamberlain, Joseph Perkins
 Clarke, Hans Thacher
 Crocker, William
 Damrosch, Walter Johannes
 Darrach, William
 Darrow, Karl Kelchner
 Davis, John William
 Detwiler, Samuel Randall
 Dewey, John
 Dinsmoor, William Bell
- Dobzhansky, Theodosius
 Douglas, Lewis W.
 DuBois, Eugene Floyd
 Dunn, Gano
 Dunn, Leslie Clarence
 Fosdick, Raymond Blaine
 Gasser, Herbert Spencer
 Gies, William J.
 Gifford, Walter Sherman
 Goodrich, Carter
 Gregg, Alan
 Gregory, William King
 Hawk, Philip Bovier
 Hayes, Carlton J. H.
 Hu Shih
 Ives, Herbert E.
 Jayne, Horace H. F.
 Jessup, Philip C.
 Jewett, Frank Baldwin
 Kelley, Nicholas
 †Lamont, Thomas William
 McGregor, James Howard
 MacInnes, Duncan A.
 Mitchell, Wesley Clair
 Moe, Henry Allen
 Murphy, Robert Cushman
 Nicolson, Marjorie Hope
 Niebuhr, Reinhold
 O'Neill, Eugene Gladstone
 Osterhout, Winthrop J. V.
 Pegram, George Braxton
 Rabi, Isidor Isaac
 Richter, Gisela M. A.
 Rivers, Thomas M.
 Robbins, William Jacob
 Rockefeller, John D., Jr.
 Rogers, Lindsay
 Rous, Peyton
 Schuyler, Robert L.
 Shotwell, James Thomson
 Simpson, George Gaylord
 Stefansson, Vilhjalmur
 Taylor, Francis Henry

†Deceased.

- Thorndike, Edward L.
 Thorndike, Lynn
 Van Doren, Carl
 Van Slyke, Donald Dexter
 du Vigneaud, Vincent
 Wallace, Henry A.
 Weaver, Warren
 Westermann, William Linn
 Wilkins, Hubert
 Willits, Joseph Henry
 Winlock, Herbert Eustis
 Wolman, Leo
 Woodworth, Robert Sessions
 Yeatman, Pope
 Young, Donald Ramsey
 Young, Owen D.
 van Zeeland, Paul
- NYACK
 Johnson, Alvin S.
- PALISADES
 MacIver, Robert M.
- PEARL RIVER
 Duggar, Benjamin Minge
- ROCHESTER
 Fenn, Wallace Osgood
 Mees, C. E. Kenneth
 Murlin, John Raymond
 Noyes, William Albert, Jr.
 Whipple, George Hoyt
- SCHENECTADY
 Coolidge, William David
 Langmuir, Irving
 Whitney, Willis R.
- TUXEDO PARK
 Loomis, Alfred Lee
- North Carolina**
- CHAPEL HILL
 MacNider, William de B.
- GREENSBORO
 Lydenberg, Harry Miller
- Ohio**
- CINCINNATI
 Blegen, Carl William
- DAYTON
 Kettering, Charles Franklin
- Pennsylvania**
- BRYN MAWR
 Carpenter, Rhys
 Swindler, Mary Hamilton
 Taylor, Lily Ross
- HAVERFORD
 Coble, Arthur Byron
- PHILADELPHIA
 Baugh, Albert Croll
 Bronk, Detlev W.
 Brown, W. Norman
 Calvert, Philip Powell
 Dickinson, John
 Duane, Morris
 Fels, Samuel S.
 Gates, Thomas Sovereign
 Goodrich, Herbert Funk
 Haney, John Louis
 Holland, Leicester Bodine
 Hopkinson, Edward, Jr.
 Huebner, Solomon Stephen
 Jacobs, Merkel Henry
 Jenkins, Charles Francis
 Johnson, Emory R.
 Kimball, Fiske
 Kline, John Robert
 Leeds, Morris Evans
 Lewis, Edwin Owen
 Lewis, Warren Harmon
 Lingelbach, William E.

- Long, Esmond Ray
 McClelland, George William
 Metz, Charles William
 Montgomery, James Alan
 Moore, J. Percy
 Morgan, Marshall S.
 Morris, Harrison Smith
 Morris, Lawrence J.
 Nichols, Roy Franklin
 Norris, George William
 Olivier, Charles P.
 Packard, Francis Randolph
 Patterson, Ernest Minor
 Pender, Harold
 Pepper, George Wharton
 Pepper, O. H. Perry
 Quinn, Arthur Hobson
 Read, Conyers
 Repplier, Agnes
 Rhoads, Charles James
 Richards, Alfred Newton
 Roberts, Owen J.
 Rosenbach, A. S. W.
 Rosenwald, Lessing J.
 Scattergood, J. Henry
 Schramm, Jacob R.
 Schaeffer, J. Parsons
 Shryock, Richard Harrison
 Singer, Edgar Arthur, Jr.
 Speiser, Ephraim Avigdor
 Stadie, William Christopher
 Wetherill, Samuel Price
 Witmer, Lightner
 Young, James Thomas
- PITTSBURGH**
- Foote, Paul Darwin
 Seitz, Frederick, Jr.
- SWARTHMORE**
- Dresden, Arnold
 Köhler, Wolfgang
 Swann, W. F. G.
- Rhode Island**
- PROVIDENCE**
- Hunter, Walter Samuel
 Kraus, Charles August
 Neugebauer, O. E.
- Tennessee**
- NASHVILLE**
- Goodpasture, Ernest William
- Texas**
- AUSTIN**
- Painter, Theophilus Shickel
- HOUSTON**
- Lovett, Edgar Odell
 Wilson, Harold Albert
- Utah**
- SALT LAKE CITY**
- Eyring, Henry
- Vermont**
- S. SHAFTSBURY**
- Frost, Robert
- Virginia**
- ALEXANDRIA**
- Schmitt, Bernadotte E.
- RICHMOND**
- Freeman, Douglas Southall
- UNIVERSITY**
- Beams, Jesse Wakefield
 Davisson, Clinton J.
 Mitchell, Samuel Alfred
- WILLIAMSBURG**
- Wertenbaker, Thomas J.

Wisconsin**MADISON**

Allen, Charles Elmer
 Birge, Edward Asahel
 Elvehjem, Conrad Arnold
 Fred, Edwin Broun

Leith, Charles Kenneth
 Stebbins, Joel

WILLIAMS BAY

Chandrasekhar, Subrah-
 manyan
 Struve, Otto

FOREIGN RESIDENTS**Argentina****BUENOS AIRES**

Amado, Alonso
 Houssay, Bernardo Alberto

Belgium**BRUSSELS**

Lemaitre, Georges

Canada**VICTORIA**

Miller, Hunter

Czechoslovakia**PRAGUE**

Beneš, Eduard

Egypt**ALEXANDRIA**

Wace, Alan J.

Mexico**MERIDA, YUCATAN**

Morley, Sylvanus Griswold

Panama**PANAMA CITY**

Méndez-Pereira, Octavio

Denmark**COPENHAGEN**

Bohr, Harald
 Bohr, Niels Henrik David
 Krogh, August

England**CAMBRIDGE**

Adrian, Edgar Douglas
 Bartlett, Frederic Charles
 Bragg, William Lawrence
 Cook, Arthur Bernard
 Dirac, Paul Adrien Maurice

DOWNE, KENT

Keith, Arthur

GREENWICH PARK

Jones, Harold S.

HARPENDEN, HERTFORDSHIRE

Fisher, Ronald Aylmer

LONDON

Bell, Harold Idris
 Carr, Cecil Thomas
 Dale, Henry Hallett
 Gardiner, Alan Henderson
 Gooch, George Peabody
 Hill, Archibald Vivian
 Kenyon, Frederic George
 Richardson, Owen Willans
 Tawney, Richard H.
 Toynbee, Arnold Joseph

OXFORD

Beazley, John Davidson
 Clay, Henry
 Craigie, William A.
 Robinson, Robert
 Ross, William David

SUSSEX

Greg, Walter Wilson

France**PARIS**

de Broglie, Louis Victor

de Margerie, Emmanuel

Rist, Charles

Germany**LEIPZIG**

Heisenberg, Werner

Italy**NAPLES**

Croce, Benedetto

ROME

De Sanctis, Gaetano

Venturi, Lionello

TURIN

Einaudi, Luigi

Netherlands**AMSTERDAM**

Brouwer, Luitzen Egbertus J.

LEIDEN

Hertzprung, Ejnar

Kramers, Hendrik A.

Norway**OSLO**

Hjort, Johan

Peru**LIMA**

García, Godofredo

Scotland**EDINBURGH**

Whittaker, Edmund Taylor

INVERNESS

Tarn, William Woodthorpe

ST. ANDREWS

Irvine, James Colquhoun

Thompson, D'Arcy W.

Spain**MADRID**

Menéndez Pidal, Ramón

Sweden**LUND**

Nilsson, Martin P.

STOCKHOLM

Heckscher, Eli Filip

UPSALA

Svedberg, Theodor

Switzerland**GENEVA**

Rappard, William E.

TICINO

Sigerist, Henry Ernest

U. S. S. R.**Moscow**

Alexandroff, Paul

Vinogradov, Ivan M.

MEMBERS ELECTED APRIL 26, 1947

CLASS I. MATHEMATICAL AND PHYSICAL
SCIENCES

Resident

Hans Albrecht Bethe.....Ithaca, N. Y.
William Albert Noyes, Jr.....Rochester, N. Y.
George Braxton Pegram.....New York, N. Y.
Henry DeWolf Smyth.....Princeton, N. J.
Hassler Whitney.....Cambridge, Mass.

CLASS II. GEOLOGICAL AND BIOLOGICAL
SCIENCES

Resident

Carl Ferdinand Cori.....St. Louis, Mo.
Conrad A. Elvehjem.....Madison, Wis.
Hermann J. Muller.....Bloomington, Ind.
William Christopher Stadie.....Philadelphia, Pa.
Edward Chace Tolman.....Berkeley, Calif.

CLASS III. SOCIAL SCIENCES

Resident

Arthur F. Burns.....New York, N. Y.
Sidney Bradshaw Fay.....Cambridge, Mass.
Walter Lippmann.....New York, N. Y.
Robert Redfield.....Chicago, Ill.

Foreign

Henry Clay.....Oxford, England
Luigi Einaudi.....Turin, Italy

CLASS IV. HUMANITIES

Resident

Otto Neugebauer.....Providence, R. I.
Reinhold Niebuhr.....New York, N. Y.
Paul Joseph Sachs.....Cambridge, Mass.
Stith Thompson.....Bloomington, Ind.

Foreign

Sir William David Ross.....Oxford, England
William Woodthorpe Tarn.....Inverness, Scotland
Lionello Venturi.....Rome, Italy

COUNCIL NOMINEE

Lessing J. Rosenwald.....Jenkintown, Pa.

MEMBERS DECEASED DURING 1947

	Date of Election
Edward P. Cheyney, February 1, aet. 86.....	1904
Moses Gomberg, February 12, aet. 81.....	1920
Pierre Janet, February 24, aet. 87.....	1940
William B. Scott, March 29, aet. 89.....	1886
Herbert Spencer Jennings, April 14, aet. 79.....	1907
Willa Cather, April 24, aet. 76.....	1934
Irving Fisher, April 30, aet. 80.....	1927
Frederick Gowland Hopkins, May 16, aet. 86.....	1937
Charles A. Kofoed, May 30, aet. 81.....	1924
William L. Bryant, June 9, aet. 77.....	1935
Evarts B. Greene, June 24, aet. 76.....	1931
Frank Clifford Whitmore, June 24, aet. 59.....	1943
Clark Wissler, August 25, aet. 77.....	1924
Franz V. M. Cumont, August, aet. <i>ca.</i> 79.....	1940
Max Planck, October 4, aet. 89.....	1933
Frank Rattray Lillie, November 5, aet. 76.....	1916
John Bassett Moore, November 12, aet. 86.....	1907
George Grant MacCurdy, November 15, aet. 84.....	1925
Godfrey Harold Hardy, December 1, aet. 70.....	1939
William Pepper, December 3, aet. 73.....	1937
Nicholas Murray Butler, December 7, aet. 85.....	1938

TABLE OF TOTALS

	Resident Members	Foreign Members
December 31, 1946.....	481	60
Elected during 1947.....	19	5
Deceased during 1947.....	16	5
December 31, 1947.....	484	60

FORMER RESIDENT MEMBERS

Before the union of the American Philosophical Society and the American Society into the American Philosophical Society held at Philadelphia for Promoting Useful Knowledge in 1769 (see Brief History of Society, p. 7), there were members of both societies and members of either society. It is impossible to establish the date of election of many of these members. Accordingly, in the list below, those marked "A" were members of the two societies at the time of the union, "B" those who were members only of the American Philosophical Society and "C" those who were members only of the American Society. Following each other name is the year of his election to membership in the American Philosophical Society.

A

Abbe, Cleveland	1871	Alison, Francis	B
Abbot, Henry L.	1862	Alison, Robert H.	1878
Abbott, Alexander C.	1897	Allen, Andrew	B
Abbott, Charles C.	1889	Allen, Benjamin	1812
Abbott, Helen C. deS. <i>See</i> Michael, Helen A.		Allen, George	1856
Abel, John J.	1915	Allen, Harrison	1867
Abercrombie, James	1796	Allen, Harrison	1896
Abert, J. J.	1832	Allen, James	B
Adams, Charles F.	1880	Allen, Joel A.	1878
Adams, Charles F.	1901	Allen, John	B
Adams, Herbert B.	1886	Allen, William	B
Adams, John	1780	Allen, W. H.	1858
Adams, John Q.	1818	Allibone, S. Austin	1865
Adams, Joseph Q.	1940	Allison, Burgiss	1789
Adamson, John C.	1856	Allison, Joseph	1875
Addison, Alexander	1791	Allison, N. S.	1814
Adler, Cyrus	1900	Ames, Charles G.	1881
Adrain, Robert	1812	Ames, Herman V.	1921
Agassiz, Alexander	1875	Ames, Joseph S.	1905
Agassiz, Elizabeth	1869	Anderson, Alexander	1791
Agnew, D. Hayes	1872	Anderson, George L.	1886
Alderman, Edwin A.	1925	Anderson, George W.	1869
Alexander, James A.	A	Anderson, Henry J.	1828
Alexander, John H.	1852	Anderson, James	B
Alexander, Joseph A.	1845	Anderson, M. B.	1867
Alexander, Stephen	1839	Andrews, Charles McL.	1924
Alexander, William, claimed 6th Earl of Stirling	1770	Andrews, E. B.	1871
		Andrews, John	1786
		Angell, James B.	1889

Anthon, Charles E.	1868	Ashhurst, John	1884
Antill, Edward	A	Ashhurst, John	1928
Appleton, William H.	1893	Ashhurst, Richard L.	1884
Arbo, John	C	Aspden, Matthias	B
Armstrong, Edward C.	1932	Atkinson, George F.	1913
Arthur, Joseph C	1919	Atterbury, William W.	1916
Ashburner, Charles A.	1880	Audubon, John J.	1831

B

Bache, Alexander D.	1829	Barnes, Albert	1855
Bache, Franklin	1820	Barnsley, Thomas	B
Bache, Hartman	1831	Barnwell, William	1802
Bache, R. Meade	1884	Bartholow, Roberts	1880
Bache, Thomas H.	1877	Bartlett, W. H. C.	1840
Bache, William	1797	Barton, Benjamin S.	1789
Bacon, W.	B	Barton, George A.	1911
Baekeland, Leo H.	1935	Barton, Richard P.	1792
Baer, George F.	1898	Barton, Thomas	B
Bailey, Joel	1770	Barton, W. P. C.	1813
Bailey, J. W.	1852	Barton, William	1787
Baird, Absalom	1791	Bartram, Isaac	C
Baird, Henry C.	1869	Bartram, John	A
Baird, Henry M.	1884	Bartram, Moses	C
Baird, Robert	1848	Bartram, William	C
Baird, Spencer F.	1855	Barus, Carl	1903
Baker, John R.	1884	Bastin, Edson S.	1896
Baker, Newton D.	1936	Bateman, Harry	1924
Baker, William S.	1886	Bauer, Louis A.	1909
Balch, Edwin S.	1899	Baugh, Daniel	1899
Balch, Thomas W.	1901	Bayard, James A.	C
Baldwin, Henry	1838	Bayard, John	1787
Baldwin, James M.	1897	Bayard, Thomas F.	1897
Baldwin, Matthias W.	1833	Baynton, John	1771
Baldwin, Simeon E.	1910	Beach, Samuel	1789
Bancker, Charles N.	1825	Beadle, E. R.	1870
Bancker, Gerard	1772	Beasley, Frederick	1814
Bancroft, George	1841	Beck, Charles F.	1845
Barber, Edwin A.	1881	Beck, James M.	1926
Barbour, Thomas	1937	Beck, Samuel	1838
Barca, Calderon de la	1848	Beck, T. Romeyn	1839
Bard, Samuel	C	Becker, Carl	1936
Barker, George F.	1873	Becker, George F.	1907
Barker, Wharton	1884	Beckley, John	1791
Barlow, Joel	1809	Bedford, Nathaniel B.	1796
Barnard, Edward E.	1903	Bee, Thomas	1781
Barnard, F. A. P.	1871	Belknap, Jeremy	1784
Barnard, William T.	1887	Bell, Alexander G.	1882

Bell, John	1832	Boardman, George D.	1880
Bell, Joseph S.	1882	Boardman, Henry A.	1851
Bement, Clarence S.	1895	Boas, Franz	1903
Benbridge, Henry	1771	Bôcher, Maxime	1916
Benezet, John	C	Boker, George H.	1884
Bennett, Charles E.	1913	Bollmann, Justus E.	1800
deBenneville, James S.	1897	Boltwood, Bertram B.	1911
Bensell, Charles	C	Bond, Phineas	B
Bentley, William	1811	Bond, Thomas	B
Berry, Edward W.	1919	Bond, Thomas, Jr.	B
Bethune, George W.	1839	Bond, W. C.	1852
Bettle, William	C	Bonnycastle, Charles	1840
Betton, Samuel	1828	Bonwill, William G. A.	1885
Betton, Thomas F.	1857	Booth, James C.	1839
Biddle, A. Sydney	1889	Borden, Simeon	1842
Biddle, Alexander	1888	Bordley, John B.	1783
Biddle, Arthur	1888	Borie, Adolph E.	1872
Biddle, Cadwalader	1880	Boss, Lewis	1911
Biddle, Clement	C	Bowditch, Henry P.	1904
Biddle, Clement C.	1821	Bowditch, Nathaniel	1809
Biddle, Craig	1877	Bowdoin, James	1787
Biddle, Edward	C	Bowen, Samuel	1769
Biddle, George W.	1897	Boyé, Martin H.	1840
Biddle, James	B	Boys, William	1799
Biddle, John	1863	Brackett, Cyrus F.	1877
Biddle, John B.	1853	Bradford, Thomas	B
Biddle, John G.	1814	Bradford, William	1785
Biddle, Nicholas	1813	Branner, John C.	1886
Biddle, Owen	C	Brashear, John A.	1902
Biddle, Thomas	1829	Brearly, David	1789
Bigelow, Jacob	1818	Breasted, James H.	1919
Billings, John S.	1887	Breck, Samuel	1838
Bingham, William	1787	Breckinridge, Robert J.	1866
Binney, Barnabas	1784	Bridges, Robert	1844
Binney, Horace	1808	Briggs, Isaac	1796
Binney, Horace	1869	Briggs, Robert	1863
Bird, Robert M.	1853	Bright, James W.	1914
Birkhoff, George D.	1921	Bringhurst, James	1774
Bispham, George T.	1895	Bringhurst, Joseph	C
Blackwell, Robert	1784	Brinton, Daniel G.	1869
Blair, Andrew A.	1889	Brinton, J. H.	1810
Blair, Samuel	1797	Brinton, John H.	1886
Blair, Thomas S.	1866	Britton, J. Blodget	1873
Blake, William P.	1870	Britton, Nathaniel L.	1928
Blasius, William	1875	Brock, Robert C.	1899
Bleakley, John	1789	Brockenbrough, John	1835
Blodget, Lorin	1872	Brooke, ———	1769
Bloomfield, Maurice	1904	Brooke, C. F. Tucker	1938

Brooks, William K.	1886	Bryant, William	1774
Brown, Amos P.	1901	Bryant, William L.	1935
Brown, Arthur E.	1879	Buchanan, George	1789
Brown, Ernest W.	1898	Buchanan, James	1846
Brown, Henry A.	1877	Bull, Marcus	1827
Brown, James	1827	Bullock, Charles	1869
Brown, John P.	1856	Bumpus, Hermon C.	1909
Brown, Nathaniel B.	1867	Bumstead, Henry A.	1918
Brown, Samuel	1800	Burd, Ed.	1785
Brown, William	1780	Burk, Isaac	1884
Brubaker, Albert P.	1895	Burk, Jesse Y.	1884
Bruce, Archibald	1807	Burrough, Marmaduke	1833
Brumbaugh, Martin G.	1908	Butler, Benjamin F.	1844
Brush, Charles F.	1910	Butler, Nicholas M.	1938
Brush, George J.	1865	Butler, William	1881
Bryan, George	A	Butts. <i>See</i> De Butts	
Bryant, Henry G.	1898		

C

Cadwalader, John	C	Carter, James C.	1895
Cadwalader, John	1867	Carter, Landon	1769
Cadwalader, John	1899	Carty, John J.	1921
Cadwalader, John	1926	Cassin, John	1852
Cadwalader, Lambert	C	Cass, Lewis	1826
Cadwalader, Thomas	A	Cassatt, Alexander J.	1872
Cadwalader, Thomas	1825	Castner, Samuel	1887
Caldwell, Charles	1796	Cather, Willa	1934
Caldwell, Samuel	B	Cathrall, Isaac	1796
Calkins, Gary N.	1920	Cattell, J. McKeen	1888
Camac, William	1874	Cattell, W. C.	1871
Campbell, George	1837	Chalmers, Lionel	C
Campbell, John L.	1875	Chamberlin, Thomas C.	1905
Campbell, William W.	1903	Chance, Henry M.	1880
Canby, William M.	1868	Chandler, Charles F.	1875
Cannon, Annie J.	1925	Chapman, Frank M.	1921
Cannon, Walter B.	1908	Chapman, Henry C.	1875
Carey, Henry C.	1833	Chapman, John	C
Carey, Mathew	1821	Chapman, Nathaniel	1807
Carleson. <i>See</i> Von Carleson		Charles, Jacques A. C.	1786
Carleton, Henry	1859	Chase, Pliny E.	1863
Carl, John F.	1875	Chase, Thomas	1864
Carmichael, William	1780	Chauncey, Charles	1813
Carnegie, Andrew	1902	Chauvenet, William	1851
Carrel, Alexis	1909	Chevalier, Peter	C
Carson, Hampton L.	1880	Cheves, Langdon	1821
Carson, John	1785	Chew, Benjamin	B
Carson, Joseph	1844	Chew, Benjamin	1787

Cheyney, Edward P.	1904	Conrad, Solomon W.	1822
Childs, George W.	1886	Conrad, Timothy A.	1865
Chittenden, Russell H.	1904	Converse, John H.	1898
Choate, Joseph H.	1906	Conyngham, John N.	1848
Christie, James	1908	Conyngham, Redmond	1819
Church, John	1802	Cook, George H.	1864
Clark, Alvan	1880	Cook, Gustavus W.	1934
Clark, Clarence H.	1889	Cook, Joel	1895
Clark, Daniel	1769	Coomb(e), Thomas	A
Clark, William B.	1902	Coombe, Thomas	1773
Clarke, Frank W.	1904	Cooper, James F.	1823
Clarke, James F.	1874	Cooper, Myles	1769
Clarke, John M.	1911	Cooper, Thomas	1802
Clarke, Thomas C.	1873	Cope, Edward D.	1866
Clarkson, Gerardus	C	Cope, Thomas P.	1843
Clarkson, Matthew	C	Coplin, W. M. Late	1911
Clay, Albert T.	1912	Coppée, Henry	1856
Clay, Joseph	1799	Cornelius, Robert	1862
Claypole, Edward W.	1883	Coues, Elliott	1878
Cleemann, Richard A.	1895	Coulter, John M.	1915
Cleemann, Thomas M.	1885	Councilman, William T.	1918
Cleveland, Charles D.	1865	Courtenay, Edward H.	1835
Cleveland, Grover	1897	Cox, Jacob D.	1870
Cleveland, Parker	1818	Cox, John	1789
Clifford, Thomas	C	Coxe, Daniel	1772
Clinton, DeWitt	1814	Coxe, Eckley B.	1870
Cloud, Joseph	1806	Coxe, John	B
Clymer, George	C	Coxe, John R.	1799
Coates, Benjamin H.	1823	Coxe, Tench	1796
Coffin, John H. C.	1869	Crafts, James M.	1916
Coghill, George E.	1935	Craig, Isaac	1787
Cohen, Joshua J.	1854	Cramp, Charles H.	1892
Cohen, J. Solis	1884	Crane, Thomas F.	1877
Colden, Cadwalader	B	Crawford, J. P. Wickersham	1929
Coleman, William	B	Cresson, Charles M.	1857
Coles, Edward	1839	Cresson, John C.	1839
Coles, Edward	1899	Cret, Paul P.	1928
Colhoun, Samuel	1815	Crile, George W.	1912
Collin, Nicholas	1789	Crowell, Edward P.	1898
Collins, Zaccheus	1804	Culin, R. Stewart	1897
Collitz, Hermann	1902	Currie, William	1792
Colwell, Stephen	1857	Curtis, George W.	1892
Comegys, Benjamin B.	1879	Curtis, Cyrus H. K.	1930
Commons, John R.	1936	Curtis, Heber D.	1920
Comstock, John H.	1913	Curwen, John	1861
Condie, D. Francis	1835	Cutler, Manasseh	1785
Conover, Samuel F.	1806	Cushing, Frank H.	1896

Cushing, Harvey	1930	Cutbush, James	1814
Cushing, Henry P.	1916	Cuyler, Theodore	1857

D

DaCosta, John C.	1904	Dickerson, Mahlon	1807
DaCosta, J. M.	1866	Dickinson, James	B
Dahlgren, Ulric	1919	Dickinson, John	A
D'Aligny, Henry F.	1870	Dickson, Leonard E.	1920
Dall, William H.	1897	Dickson, Samuel	1884
Dallas, Alexander J.	1791	Dickson, Samuel H.	1859
Dallas, George M.	1840	Dillingham, William H.	1843
Daly, Charles P.	1893	Dixon, Roland B.	1926
Dana, Charles E.	1899	Dixon, Samuel G.	1892
Dana, Edward S.	1896	Dobson, Judah	1840
Dana, James D.	1854	Dodd, William E.	1936
Darlington, William	1823	Dolley, Charles S.	1886
Davenport, Charles B.	1907	Drake, Daniel	1818
Davidson, George	1866	Donaldson, Henry H.	1906
Davidson, James	B	Doolittle, Charles L.	1881
Davidson, Robert	1783	Doolittle, Eric	1903
Davis, Arthur P.	1927	Dorr, Benjamin	1841
Davis, Benjamin	C	Dorsey, John S.	1814
Davis, Charles H.	1852	Dougherty, Thomas H.	1899
Davis, Isaac R.	1851	Douglas, James	1877
Davis, John	B	Downes, John	1843
Davis, John	1811	Draper, Daniel	1880
Davis, William M.	1883	Draper, Henry	1877
Davis, William M.	1899	Draper, John W.	1844
Day, Charles	1925	Drayton, William	1835
Day, Frank M.	1899	Dreer, Ferdinand J.	1897
Day, William C.	1899	Drexel, Anthony J.	1892
Dearborn, Benjamin	1803	Drinker, Henry	C
Deas, John	C	Drinker, John	C
De Butts, Elisha	1821	Drown, Thomas M.	1875
De Garmo, Charles	1897	Duane, Russell	1906
De Lancey, Edward F.	1898	Duane, William	1921
De Lancey, James	B	Du Bois, Patterson	1880
De Lancey, William H.	1829	Du Bois, William E.	1844
Delany, Sharp	1774	Dubourg, William	1806
Demmé, C. R.	1840	Ducatel, Julius T.	1832
Denny, Harmar	1848	Duché, Jacob	A
De Normandie. <i>See</i> Normandie		Duché, Jacob	C
Dercum, Francis X.	1892	Dudley, Charles B.	1879
Deweese, William P.	1819	Dudley, Thomas H.	1880
Dewey, Chester	1863	Duffield, Benjamin	1786
De Witt, Simeon	1787	Duffield, Edward	A
Dick, James	C	Duffield, George	1779

Duffield, Samuel	B	Dynning, George F.	1867
Dugan, Raymond S.	1931	Du Ponceau, Peter S.	1791
Dulaney, Daniel	B	Du Pont, Henry A.	1894
Dunbar, William	1800	Du Pont, Francis I.	1930
Duncán, Louis	1886	Du Pont, Iréné	1807
Dundas, James	1851	Du Pont, La Motte	1872
Dunglison, Robley	1832	Du Pont, Samuel F.	1862
Dunlap, John	1784	Durand, Elias	1854
Dunlap, Thomas	1837	Du Simitière, Pierre E.	C
Dunn, Nathan	1836	Dutton, Clarence E.	1871

E

Earle, Pliney	1866	Elmer, Jonathan	1774
East, Edward M.	1916	Elwyn, Alfred L.	1844
Easton, Morton W.	1886	Ely, Theodore N.	1897
Eberle, John	1819	Emerson, Benjamin K.	1897
Eckert, George N.	1852	Emerson, Gouverneur	1833
Eckfeldt, Jacob B.	1880	Emerson, Ralph W.	1867
Eckfeldt, Jacob R.	1844	Emerson, Rollins A.	1922
Eddy, H. Turner	1877	Emlen, George	1827
Edison, Thomas A.	1896	Emmet, John P.	1838
Edmunds, George F.	1895	Emmet, William LeR.	1898
Edsall, David L.	1906	Emmons, Samuel F.	1883
Edwards, Enoch	1787	Engelman, George	1862
Eglin, William C. L.	1926	Ericsson, John	1877
Eigenmann, Carl H.	1917	Erskine, Robert	1780
Elam, Samuel	1799	Espy, James P.	1835
Elder, William	1872	Etting, Frank M.	1876
Eldridge, Samuel	C	Evans, Cadwalader	A
Eliot, Charles W.	1871	Evans, David	C
Ellett, Charles	1843	Evans, Edmund C.	1859
Ellicott, Andrew	1785	Evans, Rowland	C
Ellicott, Joseph	1770	Eve, Oswald	A
Elliot, Andrew	C	Everett, Alexander	1831
Elliot, Samuel	C	Everett, Edward	1831
Elliott, A. Marshall	1895	Ewell, Marshall D.	1895
Elliott, Stephen	1819	Ewing, John	B

F

Farabee, William C.	1919	Felton, Samuel M.	1854
Faries, ———	B	Ferguson, William	1791
Farlow, William G.	1905	Field, Robert P.	1890
Farmer, Ferdinand	B	Findley, William	1789
Farnum, Joseph W.	1851	Fine, Henry B.	1897
Farrand, Livingston	1924	Finley, Clement A.	1856
Farrand, Max	1928	Finley, John H.	1919
Featherstonhaugh, George W. ..	1809	Fisher, Irving	1927

Fisher, Joshua F.	1833	Francis, James B.	1865
Fisher, Sidney G.	1860	Francis, J. W.	1844
Fisher, Sidney G.	1897	Francke, Kuno	1904
Fisher, Thomas	C	Frank, Leonard G.	1875
Fisher, William R.	1840	Frank, Tenney	1927
Flexner, Simon	1901	Franklin, Benjamin	A
Flint, Austin	1880	Franklin, Edward C.	1912
Flint, Austin, Jr.	1880	Franklin, William	A
Fluegel, J. G.	1853	Franklin, William T.	1786
Foggo, Edward A.	1878	Frazer, John F.	1842
Fooks, Paul	C	Frazer, John F.	1867
Forbes, Stephen A.	1919	Frazer, Persifor	1872
Ford, Paul L.	1898	Frazer, Robert P.	1873
Ford, Worthington C.	1922	Frazier, Benjamin W.	1896
Forster, John R.	1793	Frazier, Charles H.	1905
Foulke, John	1784	Friebis, George	1889
Foulke, William P.	1854	Frieze, Henry S.	1884
Fox, Dixon R.	1935	Frost, Edwin B.	1909
Fox, George	1784	Fullerton, George S.	1890
Fox, Herbert	1932	Fulton, John	1873
Fox, Joseph	B	Fulton, Robert	1809
Foxcroft, John	A	Furness, Horace H.	1880
Foxcroft, Thomas	C	Furness, Horace H.	1897
Fraley, Frederick	1842	Furness, William H.	1840
Fraley, Joseph C.	1880	Furness, William H.	1897

G

Gabb, William	1869	Gest, John M.	1921
Gale, Benjamin	A	Gest, William P.	1926
Gallatin, Albert	1791	Gibbes, George	1810
Galloway, Joseph	A	Gibbs, Josiah W.	1895
Gamble, Arch.	1784	Gibbs, Oliver W.	1854
Garden, Alexander	A	Gibson, James	1807
Garnett, John	1802	Gibson, John	B
Garrett, Philip C.	1883	Gibson, John B.	1821
Garrison, Joseph F.	1884	Gibson, William	1820
Gaston, William	1817	Gilbert, Cass	1934
Gates, Merrill E.	1886	Gilbert, Grove K.	1902
Gatschet, Albert S.	1884	Gildersleeve, Basil L.	1903
Gauld, George	1774	Gill, Theodore N.	1867
Gay, Edwin F.	1932	Gilliss, J. Melville	1848
Geddings, E.	1848	Gilman, Daniel C.	1876
Genth, Frederick A.	1854	Gilmor, Robert	1803
Genth, Frederick A.	1886	Gilpin, Henry D.	1832
George, Sidney	C	Gilpin, Joseph	1770
Gerhard, Benjamin	1854	Gilpin, Joshua	1804
Gerhard, William W.	1843	Gilpin, Thomas	C

Gilpin, Thomas	1814	Gray, George	1784
Girardin, L. H.	1819	Gray, George	1900
Glentworth, George	C	Gray, Isaac	1781
Gloxin, Benjamin	1791	Gray, James	1815
Goddard, Kingston	1857	Grayson, William	1780
Goddard, Paul B.	1840	Greely, Adolphus W.	1904
Godfrey, Thomas	B	Green, Ashbel	1789
Godman, John D.	1825	Green, Traill	1868
Godon, Silvain	1809	Green, Samuel A.	1893
Goethals, George W.	1913	Green, William H.	1863
Goldsborough, Robert	1791	Greene, Evarts B.	1931
Goldsmith, Middleton	1879	Greene, William H.	1879
Gomberg, Moses	1920	Greene, S. Dana	1898
Gooch, Frank A.	1907	Greenleaf, Simon	1848
Goodale, George L.	1893	Greenman, Milton J.	1899
Goode, George B.	1889	Greenway, James	1794
Goodell, William	1877	Gregory, Henry D.	1889
Goodfellow, Edward	1871	Grier, Robert C.	1848
Goodnow, Frank J.	1920	Griffith, J. P. Crozer	1907
Goodspeed, Arthur W.	1896	Griffith, Robert E.	1828
Goodwin, Daniel R.	1861	Griffith, Thomas W.	1838
Goodwin, Harold	1892	Griffiths, Samuel P.	1785
Goodwin, W. W.	1895	Grigsby, Hugh B.	1856
Gordon, George B.	1910	Grinnell, Henry	1853
Gorgas, William C.	1913	Griscom, John	1836
Gorringe, Henry H.	1881	Griscom, William W.	1881
Gould, A. A.	1849	Gross, Samuel D.	1854
Gould, Benjamin A.	1851	Gross, Samuel W.	1885
Gowen, Franklin B.	1877	Grote, Augustus R.	1876
Graeme, Thomas	A	Guald, George	1770
Graff, Frederick	1868	Guggenheim, William	1930
Graham, James D.	1840	Guillon, Constant	1854
Grandgent, Charles H.	1929	Gummere, Francis B.	1903
Grant, Ulysses S.	1868	Gummere, John	1814
Grassi, C. F. A.	1796	Gummere, Samuel J.	1868
Gray, Asa	1848	Gutekunst, F.	1885
Gray, Elisha	1878	Guyot, Arnold	1867

H

Hadley, Arthur T.	1902	Hale, Edward E.	1870
Hagan, Hermann A.	1886	Hale, George E.	1902
Hagert, Henry S.	1875	Hall, Asaph	1878
Hague, Arnold	1903	Hall, Charles E.	1875
Haines, John S.	1873	Hall, Charles M.	1898
Haines, Reuben	1813	Hall, David	B
Haldeman, Samuel S.	1844	Hall, Isaac H.	1893
Hale, Charles	1866	Hall, James	1854

Hall, John E.	1814	Hayes, Richard S.	1886
Hall, Lyman B.	1885	Hayford, John F.	1915
Hallock, William	1908	Hays, I. Minis	1886
Hallowell, Benjamin	1854	Hays, Isaac	1830
Hallowell, Edward	1851	Hayward, Nathan	1937
Hamilton, Alexander	1780	Hazard, Ebenezer	1781
Hamilton, James	B	Hazen, Charles D.	1923
Hamilton, William	1797	Hazlehurst, Henry	1839
Hammond, William A.	1859	Hazlehurst, Isaac	1851
Harden, John W.	1873	Heckewelder, John	1797
Harding, George	1854	Heilprin, Angelo	1883
Harding, Robert	B	Helmuth, J. H. C.	1784
Hare, Charles W.	1815	Hembel, William	1813
Hare, J. I. Clark(e)	1842	Henderson, Andrew A.	1862
Hare, Robert	1803	Henderson, C. Hanford	1896
Harkness, Edward S.	1934	Henderson, Lawrence J.	1921
Harkness, William	1898	Henderson, Robert	1927
Harlan, Richard	1822	Henderson, Yandell	1935
Harper, Robert A.	1909	Henry, Joseph	1835
Harris, Joseph S.	1887	Henry, William	C
Harris, Levett	1821	Herty, Charles H.	1917
Harris, Robert	C	Hess, Alfred F.	1931
Harris, Robert P.	1856	Hewett, Waterman T.	1893
Harris, Thomas	1828	Hewson, Thomas T.	1801
Harris, William	1838	Heywood, Thomas	1784
Harrison, Charles C.	1895	Hibben, John G.	1912
Harrison, George L.	1885	Hicks, Gilbert	B
Harrison, Joseph	C	Hildeburn, Charles R.	1897
Harrison, Joseph	1864	Hilgard, Julius E.	1863
Harrison, Peter	C	Hill, David J.	1910
Harshberger, John W.	1906	Hill, George W.	1903
Hart, James M.	1877	Hill, Hamilton A.	1882
Hart, John S.	1844	Hill, Henry	1771
Hartranft, John F.	1876	Hill, Thomas	1863
Hartshorne, Edward	1858	Hillebrand, William F.	1906
Hartshorne, Henry	1863	Hillegas, Michael	C
Hartshorne, Joseph	1815	Hiller, Hiram M.	1897
Haskins, Charles H.	1921	Hilprecht, Hermann V.	1886
Hassler, Ferd. R. . .	1807	Himes, Charles F.	1874
Hastings, Charles S.	1906	Himili, John	C
Hatcher, John B.	1897	Hirst, Barton C.	1899
Haupt, Herman	1871	Hitchcock, Charles H.	1870
Haupt, Lewis M.	1878	Hitchcock, Edward	1841
Haupt, Paul	1902	Hockley, Richard	B
Haven, Samuel F.	1865	Hockley, Thomas	1885
Hay, John	1898	Hodge, Hugh	1796
Hayden, Francis V.	1860	Hodge, Hugh L.	1832
Hayes, Isaac I.	1863	Hodge, James T.	1864

Hodgson, William B.	1830	Horsmanden, Daniel	B
Hoffman, Walter J.	1889	Hosack, David	1810
Hoge, John	1791	Hotchkiss, Jedediah	1881
Hoge, Jonathan	1786	Houckgeest, A. E. Van Braam...	1797
Holbrook, John E.	1839	Hough, Franklin B.	1882
Holden, Edward S.	1897	Hough, George W.	1872
Holiday, Henry	B	Houston, Edwin J.	1872
Holland, James W.	1886	Houston, Henry H.	1887
Holland, William J.	1928	Houston, William C.	1780
Hollingsworth, Levi	C	Howe, Henry M.	1897
Hollingsworth, Samuel L.	1856	Howell, Joshua	C
Holmes, Abiel	1816	Howell, William H.	1903
Holmes, Oliver W.	1880	Hrdlička, Aleš	1918
Holmes, William H.	1899	Hubbard, Joseph S.	1852
Holyoke, Edward A.	B	Huber, Gotthelf C.	1912
Home, Archibald	B	Humphrey, H. C.	1877
Hooker, Nathaniel	B	Humphrey, James E.	1892
Hopkins, Edward W.	1908	Humphreys, Andrew A.	1857
Hopkins, Stephen	C	Humphreys, David	1804
Hopkins, William	C	Humphreys, Joshua	1789
Hopkinson, Francis	A	Humphreys, Samuel	1826
Hopkinson, John P.	1832	Hunt, J. Gibbons	1876
Hopkinson, Joseph	1815	Hunt, Thomas S.	1861
Hopkinson, Thomas	B	Hunter, Richard S.	1895
Hopper, Edward	1869	Huntingdon, Samuel	1783
Hoppin, J. M.	1893	Huntington, Archer M.	1930
Horn, George H.	1869	Hutchins, Thomas	1772
Horner, Inman	1886	Hutchinson, Emlen	1898
Horner, William E.	1819	Hutchinson, James	1779
Horsfield, Thomas	1829	Hutchinson, James H.	1884
Horsford, E. N.	1849	Hyatt, Alpheus	1895

I

Iddings, Joseph P.	1911	d'Invilleers, Edward V.	1893
Ingersoll, Charles J.	1815	Irvin, David	1841
Ingersoll, Jared	1781	Irving, Washington	1829
Ingersoll, Joseph R.	1825	Ives, Frederick E.	1922
Ingersoll, Ralph J.	1848	Izard, George	1807
Ingham, Samuel D.	1840	Izard, Ralph	C
Ingham, William A.	1875		

J

Jackson, A. V. Williams	1909	Jackson, Paul	C
Jackson, Chevalier	1919	Jackson, R. M. S.	1863
Jackson, David	1792	Jackson, Samuel	1823
Jackson, Isaac R.	1841	Jacobs, Benjamin	C
Jackson, James	1818	Jacobs, William S.	1802

James, Abel	C	Johnson, Douglas	1920
James, Edmund J.	1884	Johnson, Eldridge R.	1928
James, Edwin	1833	Johnson, William	C
James, John F.	1848	Johnson, William	1810
James, Joseph	1787	Johnston, Francis	1787
James, Thomas C.	1797	Johnston, John	1876
James, Thomas P.	1857	Jones, Charles C.	1881
Jameson, David	C	Jones, Harry C.	1910
Jameson, J. Franklin	1920	Jones, Isaac	B
Jarvis, Edward	1863	Jones, Joel	1848
Jarvis, Samuel F.	1820	Jones, John	1769
Jastrow, Morris	1897	Jones, John	1774
Jay, John	1780	Jones, Lewis R.	1925
Jayne, Henry LaB.	1898	Jones, Robert S.	B
Jayne, Horace	1885	Jones, Thomas P.	1831
Jefferis, William W.	1882	Jones, Walter	1774
Jefferson, Thomas	1780	Jones, William	1805
Jenks, John S.	1936	Jordan, David S.	1905
Jenks, William	1837	Jordan, Francis	1884
Jennings, Herbert S.	1907	Justice, George M.	1839
Johnson, Alba B.	1911		

K

Kane, Elisha K.	1857	Kent, William	1848
Kane, Elisha K.	1883	Keppel, Frederick P.	1938
Kane, John K.	1825	Kerr, William C.	1872
Kane, Thomas L.	1856	Kidd, John	A
Keane, John J.	1889	King, Clarence	1872
Kearsley, John	B	King, Edward	1852
Kearsley, John	C	Kinnersley, Ebenezer	A
Keasbey, Lindley M.	1899	Kirk, John F.	1864
Keating, William H.	1822	Kirkbride, Joseph	B
Keating, William V.	1854	Kirkbride, Thomas S.	1851
Keen, Gregory B.	1897	Kirkwood, Daniel	1851
Keen, William W.	1884	Kirtland, Jared P.	1875
Keim, George DeB.	1882	Kittera, John W.	1793
Keiser, Edward H.	1898	Kittredge, George L.	1905
Keller, Harry F.	1900	Kneass, Strickland	1856
Kelley, William D.	1884	Knight, Jacob B.	1878
Kellogg, Frank B.	1931	Knox, Henry	1791
Kellogg, Vernon	1920	Koenig, George A.	1874
Kemmerer, Edwin W.	1932	Kofoid, Charles A.	1924
Kemp, James F.	1912	Kraemer, Henry	1899
Kendall, E. Otis	1842	Krauth, Charles P.	1864
Kenderdine, Robert S.	1874	Kuhn, Adam	A
Kennedy, John P.	1853	Kuhn, Hartman	1840
Kennelly, Arthur E.	1896	Kunze, J. C.	1780
Kent, James	1829		

L

Lambert, Preston A.	1904	Leverett, Frank	1924
Lamberton, William A.	1899	Levis, Richard J.	1872
Lamborn, Robert H.	1864	Lewis, Elisha J.	1855
Landreth, Burnet	1878	Lewis, Francis W.	1860
Landsteiner, Karl	1935	Lewis, G. Albert	1896
Langley, Samuel P.	1875	Lewis, Gilbert N.	1918
Lanman, Charles R.	1906	Lewis, Henry C.	1881
Lapham, Increase A.	1874	Lewis, John F.	1909
Lardner, Lynford	B	Lewis, Joseph J.	1881
La Roche, C. Percy	1873	Lewis, Meriwether	1803
La Roche, René	1827	Leyburn, John	1856
Latrobe, Benjamin H.	1799	Libbey, William	1897
Latrobe, John H. B.	1854	Lillie, Frank R.	1916
Laurens, Henry	1772	Lindgren, Waldemar	1917
Laurens, John	1780	Lippincott, J. Bertram	1921
Law, Edward E.	1853	Lippincott, Joshua B.	1869
Law, Philip H.	1879	Lippincott, J. Dundas	1899
Lawes, John B.	1883	Livezey, Thomas	C
Lawrence, Jason O'B.	1823	Livingston, Edward	1825
Lea, Arthur H.	1912	Livingston, Robert R.	1801
Lea, Henry C.	1867	Livingston, William	B
Lea, Isaac	1828	Lloyd, James	1771
Learned, Marion D.	1899	Locke, John	1844
Le Conte, John	1851	Loeb, Jacques	1899
Le Conte, John	1873	Logan, George	1793
Le Conte, John L.	1853	Logan, William	B
Le Conte, Joseph	1873	Logan, William, Jr.	B
Le Conte, Robert G.	1905	Lonley, Benjamin	B
Lee, Arthur	B	Long, Stephen H.	1823
Lee, Francis L.	B	Longfellow, Samuel	1878
Lee, Thomas J.	1862	Longstreth, Miers F.	1848
Leech, Edward A.	1892	Longstreth, Morris	1878
Legare, Hugh S.	1838	Loomis, Elias	1839
Le Gaux, Peter	1789	Lorimer, John	1769
Lehman, Ambrose E.	1883	Lovering, Joseph	1881
Leidy, Joseph	1849	Low, Seth	1892
Lenox, James	1854	Lowell, A. Lawrence	1909
Lenthall, John	1843	Lowell, James R.	1883
Leonard, James B.	1897	Lowell, John	1787
Lérébours, Alexander	1796	Lowell, Percival	1897
Lesley, J. Peter	1856	Lowes, John L.	1934
Lesley, Joseph	1863	Lowrie, Walter H.	1859
Leslie, Robert	1795	Ludlow, James R.	1884
Lesquereux, Leo	1861	Ludlow, John	1839
Letchworth, Albert S.	1856	Ludlow, William	1884
Levene, Phoebus A.	1923	Lukens, Isaiah	1820

Lukens, Jesse	1772	Lyman, Benjamin S.	1869
Lukens, John	A	Lynch, W. F.	1853
Lusk, Graham	1924		

M

Mabery, Charles F.	1897	Magie, William F.	1896
MacAlister, James	1886	Mahan, Alfred T.	1897
McArthur, John	1875	Maisch, John M.	1884
McCall, Charles A.	1881	Mall, Franklin P.	1906
McCall, George A.	1854	Mallery, Garrick	1882
McCall, Peter	1851	Mallet, John W.	1885
McCauley, Edward Y.	1881	Manly, John M.	1912
McCay, Leroy W.	1897	Mansfield, Ira F.	1878
McClellan, Arch.	1772	Mansfield, Jared	1816
McClenahan, Howard	1931	March, Francis A.	1878
McClune, James	1863	Margolis, Max L.	1927
McClung, Clarence E.	1913	Mark, Edward L.	1907
McClurg, James	1774	Marks, William D.	1878
McCook, Henry C.	1896	Marsh, Benjamin V.	1864
McCosh, James	1871	Marsh, George P.	1849
McCrae, Thomas	1914	Marsh, Othniel C.	1868
McCrea, James	1910	Marshall, Frederick	1771
McCreath, Andrew S.	1879	Marshall, Humphrey	C
McCulloh, Richard S.	1846	Marshall, John	1830
MacCurdy, George G.	1925	Marshall, John	1886
McDowell, John	1807	Martin, Alexander	1797
McEuen, Charles	1843	Martin, Edward	1933
McEuen, Thomas	1830	Martindale, Isaac C.	1880
Macfarlane, James	1883	Martyn [Martin?], David	B
Macfarlane, John M.	1892	Marvin, Charles F.	1916
McHenry, James	1785	Mason, Andrew	1867
McIlvaine, William	1826	Mason, John Y.	1847
McKean, Joseph B.	1824	Mason, Otis T.	1899
McKean, Thomas	B	Mason, William P.	1896
McKean, William V.	1877	Mather, Joseph	C
McLane, Louis	1831	Matile, George A.	1856
MacLaurin, Richard C.	1910	Matlack, Timothy	1780
Maclean, John	1805	Matthew, William D.	1914
Maclure, William	1799	Matthews, Albert	1899
McMaster, John B.	1884	Maury, M. F.	1852
McMichael, Morton	1867	May, Addison	1881
Macneven, William J.	1823	May, Joseph	1883
McQuillen, John H.	1877	Mayer, Alfred M.	1869
Madison, James	1780	Mayor, Alfred G.	1914
Madison, James	1785	Meade, George G.	1871
Magaw, Samuel	1784	Meade, William	1817
Magee, Christian	B	Mease, James	1802

Meehan, Thomas	1871	Mitchell, Howard H.	1925
Meek, F. B.	1867	Mitchell, James T.	1890
Meem. <i>See</i> Mim		Mitchell, John	B
Meigs, Arthur V.	1899	Mitchell, John K.	1827
Meigs, Charles D.	1826	Mitchell, Maria	1869
Meigs, John F.	1852	Mitchell, O. M.	1853
Meigs, Josiah	1818	Mitchell, S. L.	1791
Meigs, Montgomery C.	1854	Mitchell, S. Weir	1862
Meigs, William M.	1901	Modjeski, Ralph	1926
Melscheimer, Val.	1795	Monro, George	1789
Meltzer, Samuel J.	1914	Montgomery, Thomas H.	1898
Melville, George W.	1897	Montgomery, Thomas L.	1927
Mendel, Lafayette B.	1916	Moore, Charles	A
Mendenhall, Charles E.	1924	Moore, Clarence B.	1897
Mendenhall, Thomas C.	1899	Moore, Clifford H.	1928
Mercer, Charles F.	1817	Moore, Eliakim H.	1905
Mercer, Henry C.	1895	Moore, George F.	1920
Mercer, Hugh	C	Moore, Gideon E.	1875
Meredith, William	1813	Moore, James W.	1885
Meredith, William M.	1837	Moore, John B.	1907
Merriam, C. Hart	1902	Moore, Richard B.	1923
Merriam, John C.	1914	Moore, Samuel	1805
Merrick, John V.	1880	Moore, Samuel P.	1771
Merrick, Samuel V.	1833	Moore, Thomas	1809
Merrill, George P.	1923	Mordecai, Alfred	1853
Merriman, Mansfield	1881	Morehouse, George R.	1877
Messchert, Matthew H.	1873	Morell, John	1770
Michael, Helen Abbott	1887	Morgan, Benjamin	1774
Michelson, Albert A.	1902	Morgan, Benjamin R.	1813
Miffin, J. F.	1796	Morgan, George	C
Miffin, Thomas	C	Morgan, John	C
Miffin, Samuel	B	Morgan, Thomas H.	1915
Miles, Samuel	C	Morley, Edward W.	1903
Milledoler, Philip	1840	Morley, Frank	1897
Miller, Dayton C.	1919	Morris, Caspar	1851
Miller, E. Spencer	1857	Morris, Ellwood	1843
Miller, Edward	1805	Morris, Israel W.	1899
Miller, Edward	1845	Morris, J. Cheston	1883
Miller, J. Imbrie	1870	Morris, Jacob G.	1851
Miller, John A.	1915	Morris, John	C
Miller, Leslie W.	1899	Morris, John	1786
Miller, Peter	C	Morris, John G.	1893
Miller, Samuel	1800	Morris, John T.	1901
Milligan, George	1772	Morris, Robert	1786
Milligan, Robert	1787	Morris, Robert H.	B
Mim [Meem], John	C	Morris, Roland S.	1922
Minot, Charles S.	1896	Morrow, Dwight W.	1931
Minto, Walter	1789	Morse, Edward S.	1895

Morse, Harmon N.	1903	Muhlenberg, Henry E.	1785
Morse, Samuel F. B.	1848	Munro, Dana C.	1901
Morton, Henry	1867	Munroe, Charles E.	1891
Morton, Henry J.	1857	Murdock, Joseph B.	1886
Morton, Samuel G.	1828	Murgatroyd, John	C
Morton, Thomas G.	1900	Murray, Joseph	B
Motley, John L.	1861	Murray, Joseph A.	1880
Mower, T. G.	1844	Mütter, Thomas D.	1851
Muhlenberg, Fred. A.	1878		

N

Nancarrow, John	1794	Nipher, Francis E.	1907
Nassy, David	1793	Noble, G. Kingsley	1933
Neill, John	1852	Noguchi, Hideyo	1921
Neilson, William A.	1944	de Normandie, John A.	B
Newberry, J. S.	1867	Norris, George W.	1844
Newbold, William R.	1909	Norris, George W.	1937
Newcomb, Simon	1878	Norris, Isaac	1872
Newnan, John	1797	Norris, Joseph P.	1815
Newton, Hubert A.	1867	Norris, William	1838
Nichols, Edward L.	1904	Norris, William F.	1886
Nichols, Ernest F.	1906	North, Edward	1885
Nichols, Francis	1803	Norton, William A.	1844
Nichols, Starr H.	1872	Noyes, Arthur A.	1911
Nicholson, John	1791	Noyes, William A.	1914
Nicklin, Philip H.	1829	Nulty, Eugenius	1817
Nicola, Lewis	C	Nuttall, Thomas	1817
Nicollet, J. N.	1842	Nuttall, Zelia	1895

O

Oberlin, John F.	C	Orton, Edward	1897
Ochs, Adolph S.	1931	Osborn, Henry F.	1887
Odell, Jonathan	C	Osborn, Henry S.	1867
Okely, John	C	Osborne, Thomas B.	1921
Oliver, Andrew	C	Osgood, William F.	1915
Oliver, Andrew	1773	Otis, George A.	1821
Oliver, Charles A.	1886	Otolenge, Joseph	1771
Oliver, James E.	1873	Otto, John C.	1817
Olney, Richard	1897	Otto, John M.	1769
Ord, George	1817	Outerbridge, Alexander E.	1880
Ortmann, Arnold E.	1897		

P

Packard, Alpheus S.	1878	Palmer, William R.	1859
Packard, John H.	1867	Pancoast, Henry S.	1898
Page, Mann	1785	Pancoast, Joseph	1851
Paine, Robert T.	1838	Pancoast, William H.	1883
Paine, Thomas	1785	Pardee, Ario	1867

Park, Roswell	1841	Penniman, Josiah H.	1901
Parke, Thomas	1774	Pennypacker, Samuel W.	1886
Parr, William	1771	Penrose, Charles B.	1909
Parrish, Dillwyn	1883	Penrose, R. A. F.	1863
Parrish, Joseph	1815	Penrose, Richard A. F.	1905
Parsons, William	B	Pepper, Edward	1886
Parvin, Theophilus	1885	Pepper, William	1851
Paschall, Isaac	C	Pepper, William	1870
Paschall, John	C	Pepper, William	1937
Paschall, Joseph	C	Perkins, Jacob	1819
Paschall, Stephen	C	Perkins, John	1774
Paterson, William	1789	Peter, Robert	1872
Paton, Stewart	1914	Pettee, William H.	1898
Patterson, C. Stuart	1885	Peters, Christian H. F.	1878
Patterson, Carlile P.	1880	Peters, Richard	B
Patterson, Edward	1900	Pettit, Charles	1779
Patterson, Robert	1783	Pettit, Henry	1895
Patterson, Robert	1851	Phelps, Edward J.	1895
Patterson, Robert M.	1809	Phelps, William L.	1927
Patterson, Thomas L.	1853	Phillips, Francis C.	1899
Pattison, Robert E.	1893	Phillips, Henry	1877
Patton, Francis L.	1897	Phillips, Henry M.	1871
Paul, J. Rodman	1899	Physick, Edmund	C
Paulding, James K.	1839	Physick, Philip S.	1802
Peale, Charles W.	1786	Pickering, Charles	1828
Peale, Franklin	1833	Pickering, Edward C.	1896
Peale, Titian R.	1833	Pickering, John	1820
Pearce, Richard M.	1914	Pickering, Tim.	1795
Pearl, Raymond	1915	Picot, Charles	1848
Pearse, John B.	1875	Piersol, George A.	1897
Pearson, James	C	Pilsbry, Henry A.	1895
Pearson, Leonard	1908	Pinckney, C. C.	1789
Pease, Calvin	1863	Pinckney, Thomas	1797
Peck, William D.	1796	Pine, Robert E.	1786
Peckham, Stephen F.	1897	Pirsson, Louis V.	1918
Peirce, Benjamin	1842	Platt, Charles	1898
Peirce, Benjamin O.	1910	Platt, Franklin	1874
Peiree, C. Newlin	1878	Plitt, John	1823
Pemberton, Henry	1873	Poinsett, Joel R.	1827
Pemberton, Israel	B	Pollock, George	1813
Pemberton, James	B	Pollock, James	1863
Penington, Edward	C	Pool(e), William	C
Penington, Edward	1808	Porter, Thomas C.	1864
Penington, Edward	1875	Post, Chr. F.	C
Penington, John	1791	Potter, Alonzo	1844
Penington, John	1839	Potts, Jonathan	C
Penn, John	B	Potts, Joseph D.	1892
Penn, Richard	B	Potts, Thomas	B

Potts, William J.	1885	Prince, John	1805
Powel, Samuel	C	Prince, John D.	1913
Powel, Samuel	1855	Pritchett, Henry S.	1899
Powell, John W.	1889	Proctor, William	1847
Prescott, Albert B.	1898	Proud, Robert	B
Prescott, William H.	1838	Pryor, Thomas	A
Preston, Thomas	1771	Pugh, Evan	1862
Price, Eli K.	1854	Pumpelly, Raphael	1874
Price, Eli K.	1916	Pupin, Michael I.	1896
Price, J. Sergeant	1867	Purviance, Samuel	B
Prime, Ebenezer	1769	Putnam, Frederick W.	1895
Prime, Frederick	1873		

Q

Quincy, Edmund	1870	Quincy, Josiah	1829
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R

Raguet, Condy	1822	Reed, Henry	1886
Ramsay, David	1803	Reed, John	1848
Rand, Edward K.	1925	Reed, Joseph	1816
Rand, B. Howard	1857	Reed, T. B.	1877
Rand, Theodore D.	1873	Reed, William B.	1856
Randall, F. A.	1878	Reese, Charles L.	1922
Randall, Samuel J.	1885	Reese, John J.	1852
Randolph, Edmund	1791	Reeves, Jesse S.	1934
Randolph, Jacob	1833	Reeves, Samuel J.	1869
Randolph, Nathaniel A.	1884	Reid, Harry F.	1910
Randolph, Thomas M.	1794	Reisner, George A.	1940
Ransome, Frederick L.	1935	Remington, Joseph P.	1899
Rau, Charles	1882	Remsen, Ira	1879
Ravenel, Mazzyk P.	1901	Rennert, Hugo A.	1899
Rawle, Francis	C	Renwick, James	1823
Rawle, Francis	1898	Reynell, John	B
Rawle, William	1786	Reynolds, Joel B.	1851
Rawle, William	1841	Rhea, John	B
Rawle, William B.	1899	Rhoads, Edward	1863
Rawle, William H.	1887	Rhoads, Edward	1903
Raymond, Rossiter W.	1875	Rhoads, James E.	1893
Raynolds, William F.	1867	Rhoads, Samuel	B
Rea, Samuel	1913	Rhoads, Samuel	1771
Read, John M.	1863	Rhoads, Samuel N.	1897
Read, John M.	1867	Rhodes, James F.	1910
Reade, Charles	A	Rice, Edwin W.	1928
Reade, Joseph	B	Richards, Benjamin W.	1839
Redfield, W. C.	1844	Richards, Horace C.	1907
Redick, David	1789	Richards, Theodore W.	1902
Redman, John	A	Richardson, Joseph	B
Reed, Henry	1833	Riché, George I.	1885

Richtmyer, Floyd K.	1935	Romans, Bernard	1774
Ricketts, Palmer C.	1914	Rood, Ogden N.	1880
Ridgely, Charles	C	Roosevelt, Theodore	1904
Riley, Charles V.	1876	Root, Elihu	1906
Rittenhouse, Benjamin	1789	Rosa, Edward B.	1912
Rittenhouse, David	A	Rosengarten, Adolph G.	1940
Rives, William C.	1831	Rosengarten, George D.	1919
Roberts, George	C	Rosengarten, Joseph G.	1891
Roberts, George B.	1885	Ross, Andrew	1791
Roberts, Hugh	B	Ross, James	1791
Roberts, Joseph	1829	Ross, John	B
Roberts, Solomon W.	1843	Rotch, A. Lawrence	1911
Roberts, W. Milnor	1876	Rothermel, Peter F.	1873
Robins, James W.	1882	Rothrock, Joseph T.	1877
Robinson, Moneure	1833	Rouelle, John	1792
Robinson, Samuel	C	Rowe, Leo S.	1911
Rodgers, John R. B.	1787	Rowland, Henry A.	1896
Roepper, W. T.	1871	Royce, Josiah	1908
Rogers, Ebenezer P.	1855	Rudder, William	1878
Rogers, Fairman	1857	Rumsey, James	1789
Rogers, Henry D.	1835	Rumsey, William	B
Rogers, James B.	1846	Ruschenberger, W. S. W.	1849
Rogers, Robert E.	1855	Rush, Benjamin	C
Rogers, Robert W.	1890	Rush, James	1827
Rogers, William B.	1835	Rush, Richard	1817
Rogers, William B.	1880	Rushton, Thomas	1787
Röhrig, F. L. Otto	1862	Ryder, John A.	1886
Rolfe, John C.	1907		

S

Sachse, Julius F.	1894	Schelling, Felix E.	1902
Sadtler, Samuel P.	1874	Schlesinger, Frank	1912
St. Clair, Arthur	1780	Schott, Charles A.	1863
St. John, Charles E.	1928	Schoolcraft, Henry R.	1833
Sajous, Charles E.	1888	Schuchert, Charles	1913
Sampson, Alden	1897	Schurman, Jacob G.	1908
Sanders, Richard H.	1897	Schurz, Carl	1878
Sanderson, John	1840	de Schweinitz, George E.	1912
Sansom, Joseph	1806	Schweinitz, Lewis	1817
Sapir, Edward	1937	Scott, Charles F.	1898
Sargent, Charles S.	1882	Scott, James B.	1930
Sargent, Winthrop	1789	Scott, John M.	B
Sartain, John	1897	Scott, John M.	1815
Sauveur, Albert	1919	Scott, John M.	1926
Saxton, Joseph	1837	Scott, Lewis A.	1880
Say, Thomas	1817	Scott, William B.	1886
Schaeffer, Fred. C.	1819	Scudder, Samuel H.	1878
Schäffer, Charles	1893	Scull, William	C

Sedgwick, William T.	1911	Skinner, Henry	1922
Seidensticker, Oswald	1870	Smibert, Williams	C
Seiler, Emma	1870	Smilie, John	1791
Seiler, Carl	1879	Smith, A. Donaldson	1897
Sellers, Coleman	1872	Smith, Albert H.	1878
Sellers, Coleman	1899	Smith, Allen J.	1907
Sellers, John	A	Smith, Aubrey H.	1860
Sellers, William	1864	Smith, Charles	1805
Sergeant, John	1813	Smith, Charles E.	1858
Sergeant, Jonathan D.	1784	Smith, Daniel B.	1829
Sergeant, Thomas	1832	Smith, Edgar F.	1887
Setchell, William A.	1919	Smith, Erwin F.	1916
Seybert, Adam	1797	Smith, Francis G.	1852
Seybert, Henry	1824	Smith, George	1863
Seymour, Thomas D.	1906	Smith, George W.	1840
Shaeffer, George C.	1865	Smith, Isaac	C
Shäffer, Charles	1893	Smith, J. Lawrence	1857
Shäffer, Charles	1893	Smith, James P.	1922
Shaler, William	1826	Smith, John	A
Shapleigh, Waldron	1899	Smith, John R.	1800
Sharp, Benjamin	1886	Smith, Jonathan B.	B
Sharples, Philip P.	1881	Smith, Lloyd P.	1873
Sharples, Stephen P.	1882	Smith, Preserved	1937
Sharpless, Isaac	1884	Smith, Rich. P.	1796
Sharswood, George	1851	Smith, Richard S.	1864
Sheafer, Peter W.	1863	Smith, Robert	B
Shear, Theodore L.	1939	Smith, Samuel	B
Sheppard, Furman	1875	Smith, Samuel H.	1797
Sherwood, Andrew	1875	Smith, Samuel S.	1785
Shields, Charles W.	1877	Smith, Stephen	1875
Shiell, Hugh	1781	Smith, Theobald	1915
Shippen, Edward	B	Smith, Thomas	B
Shippen, Edward, Jr.	B	Smith, Thomas P.	1799
Shippen, Edward	1868	Smith, William	B
Shippen, Joseph	B	Smith, William	B
Shippen, Thomas L.	1793	Smith, William, Jr.	B
Shippen, William	B	Smith, William	1792
Shippen, William, Jr.	B	Smith, William P.	B
Shoemaker, Samuel	1769	Smith, William W.	1787
Shorey, Paul	1920	Smock, John C.	1897
Short, Charles W.	1835	Smyth, Albert H.	1887
Short, William	1804	Smyth, Charles H.	1908
Shumard, Benjamin F.	1867	Smyth, Herbert W.	1908
Shurtleff, Nathaniel B.	1857	Snowden, A. Loudon	1873
Sigsbee, Charles D.	1899	Snyder, Monroe B.	1884
Silliman, Ben.	1805	Sonmans, Peter	C
Sinclair, William J.	1923	Southard, Samuel L.	1831
Sinkler, Wharton	1900	Spangler, Henry W.	1891

Sparks, Jared	1837	Stockard, Charles R.	1924
Spitzka, Edward A.	1908	Stockton, Richard	B
Spofford, Ainsworth R.	1873	Stokes, William A.	1872
Sproul, William C.	1920	Stone, Frederick D.	1895
Squibb, Edward R.	1897	Stone, Harlan F.	1939
Squier, George O.	1917	Stone, Witmer	1913
Stallo, John B.	1881	Storer, D. Humphreys	1842
Staughton, William	1808	Storrs, William L.	1848
Stedman, Alexander	B	Story, Joseph	1844
Steinhauer, Henry	1817	Stratton, Samuel W.	1904
Steinmetz, Charles P.	1917	Straus, Oscar S.	1917
Stengel, Alfred	1903	Strawbridge, George	1877
Stephens, Alexander H.	1848	Strickland, William	1820
Stephens, Henry M.	1897	Strong, Theodore	1844
Stephens, John L.	1841	Strong, William	1866
Sterrett, John R. S.	1908	Stuart, George	1877
Steuben, Frederick W., Baron de ..	1780	Stuart, Moses	1824
Stevens, John	1789	Sullivan, William	1838
Stevens, Walter LeC.	1884	Sullivant, William S.	1862
Stevens, William B.	1854	Sully, Thomas	1835
Stevenson, John J.	1877	Sulzberger, Mayer	1895
Stevenson, Sara Y.	1895	Summer, Charles	1867
Stewart, John	1797	Sumner, Francis B.	1938
Stieglitz, Julius	1919	Survilliers, Joseph B., Count de ..	1823
Stiles, Ezra	B	Swain, Joseph	1918
Stiles, Joseph	C	Swasey, Ambrose	1919
Stille, Alfred	1852	Swift, Joseph G.	1814
Stillé, Charles J.	1867	Syle, E. W.	1884
Stillman, Samuel	C	Sylvester, J. J.	1877
Stillwell, Lewis B.	1898	Syng, Peter	C
Stirling, 6th Earl of. <i>See</i> Alexander, William		Syng, Philip	B

T

Taft, William H.	1909	Tennent, Gilbert	B
Tait, Charles	1827	Tennent, David H.	1938
Talcott, Andrew	1838	Tesla, Nikola	1896
Taney, Roger B.	1844	Thaxter, Roland	1912
Tanner, Henry S.	1829	Thayer, Russell	1875
Tatham, William	1897	Thayer, M. Russell	1877
Tatham, William P.	1875	Thayer, Sylvanus	1838
Taussig, Frank W.	1929	Thayer, William R.	1918
Taylor, Alonzo E.	1917	Thayer, William S.	1924
Taylor, Frederick W.	1912	Thomas, Allen C.	1884
Taylor, Henry O.	1926	Thomas, Isaiah	1816
Taylor, Richard C.	1839	Thomas, Richard	1771
Taylor, William B.	1877	Thompson, Heber S.	1884

Thompson, Oswald	1859	Towne, John H.	1851
Thompson, Robert E.	1874	Townsend, Joseph B.	1868
Thompson, William	1880	Townsende, Washington	1882
Thomson, Charles	C	Trautwine, John C.	1844
Thomson, Elihu	1876	Trautwine, William	1882
Thomson, Frank	1874	Trelease, William	1903
Thomson, James G.	1818	Trego, Charles B.	1843
Thomson, William	1880	Trimble, Henry	1897
Thurston, Robert H.	1902	Troost, Gerhard	1816
Ticknor, George	1828	Trowbridge, Augustus	1911
Tidyman, Philip	1825	Trowbridge, John	1896
Tilghman, Benjamin C.	1871	Trowbridge, William P.	1872
Tilghman, Benjamin C.	1902	True, Frederick W.	1899
Tilghman, James	B	True, Rodney H.	1923
Tilghman, Richard A.	1847	Trumbull, Henry C.	1884
Tilghman, William	1805	Trumbull, John	1792
Tilghman, William M.	1870	Tucker, George	1837
Tilney, Frederick	1930	Tucker, J. Randolph	1895
Tilton, James	1773	Turner, George	1790
Titchener, Edward B.	1906	Tuttle, David K.	1889
Tittmann, Otto H.	1906	Tweedy, John	C
Toppan, Robert N.	1886	Tyler, Lyon G.	1889
Torrey, John	1835	Tyndale, Hector	1869
Totten, George M.	1851	Tyson, James	1887
Totten, Joseph G.	1836	Tyson, Job R.	1836
Tower, Charlemagne	1895	Tyson, Philip T.	1869

U

Uhler, William M.	1858
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V

Vaillant, George C.	1943	Vaux, George	1897
Vanderkemp, F. A.	1805	Vaux, Richard	1884
Vanderkemp, John J.	1840	Vaux, Roberts	1819
Van Hise, Charles R.	1909	Vaux, William S.	1859
Vanuxem, Lardner	1822	Venable, Francis P.	1905
Vauclain, Samuel M.	1899	Vere, Scheele de	1885
Vaughan, John	1784	Vethake, Henry	1831
Vaughan, Samuel	1784	Vining, John	C
Vaughan, Victor C.	1909	Vose, George L.	1870

W

Wagner, Samuel	1885	Walker, John	C
Wagner, Tobias	1841	Walker, Sears C.	1837
Wahl, William H.	1874	Wall, George	1785
Walcott, Charles D.	1897	Wallace, Ellerslie	1884

Waln, Lewis	1846	Wharton, Joseph	1869
Waln, Nicholas	C	Wharton, Samuel	C
Walsh, Robert	1812	Wharton, Thomas	C
Walter, Thomas U.	1839	Wharton, Thomas I.	1830
Ward, Lester F.	1889	Wheatley, Charles M.	1879
Ward, Robert De C.	1922	Wheaton, Henry	1829
Warden, David B.	1809	Wheeler, William M.	1916
Ware, Lewis S.	1881	Wheeler, Samuel	1795
Ware, Nathaniel A.	1823	White, Andrew D.	1869
Warfield, Ethelbert D.	1897	White, David	1921
Waring, William	1793	White, Israel C.	1878
Warren, Gouverneur K.	1867	White, William	C
Warren, John C.	1818	Whitehead, Alfred N.	1926
Washburne, E. A.	1863	Whitfield, Robert P.	1898
Washington, Bushrod	1805	Whitfield, J. Edward	1905
Washington, George	1780	Whitman, Charles O.	1899
Washington, Henry S.	1922	Whitman, William E.	1865
Waterhouse, Benjamin	1791	Whitmore, Frank C.	1943
Waters, Nicholas B.	1792	Whitney, George	1880
Watson, James F.	1878	Whitney, Josiah D.	1863
Watts, Stephen	A	Whitney, William D.	1863
Way, Nicholas	1773	Whittier, John G.	1870
Wayland, Francis	1838	Whittlesey, Chauncey	B
Wayland, Herman I.	1890	Wickham, John	1835
Wayne, Anthony	1780	Wilcocks, Alexander	B
Wayne, Henry C.	1858	Wilcocks, Alexander	1864
Wayne, Isaac	1840	Wilder, Burt G.	1878
Webb, James	C	Wiley, Harvey W.	1904
Webber, Sam.	1804	Wilkes, Charles	1843
Webster, Arthur G.	1906	Wilkinson, James	1798
Webster, Daniel	1837	Willard, Joseph	1804
Webster, Noah	1827	Willcox, Joseph	1895
Weil, Edward H.	1885	Williams, Edward H.	1897
Weimer, Albert B.	1927	Williams, Henry J.	1833
Welch, William H.	1896	Williams, Jonathan	1787
Wells, Richard	C	Williams, Samuel	1772
Welsh, Herbert	1884	Williams, Talcott	1888
Welsh, John	1867	Williamson, Hugh	B
West, Francis	1854	Williamson, Robert S.	1870
West, Samuel	B	Willing, Thomas	B
West, William	B	Willis, Henry	1890
Wetherill, John P.	1827	Williston, Samuel W.	1918
Wetherill, John P.	1878	Wilson, Alexander	1813
Wetherill, Charles M.	1851	Wilson, Edmund B.	1888
Wharton, Charles H.	1786	Wilson, Henry V. P.	1932
Wharton, George M.	1840	Wilson, James	C
Wharton, Henry	1880	Wilson, James C.	1885
Wharton, Isaac	C	Wilson, James P.	1814

Wilson, Joseph M.	1874	Wood, Richard	1879
Wilson, Thomas B.	1852	Wood, Robert W.	1908
Wilson, William P.	1887	Wood, Stuart	1899
Wilson, Woodrow	1897	Woodhouse, James	1796
Winchell, Alexander	1865	Woodward, Henry	1874
Winsor, Henry	1862	Woodward, Robert S.	1902
Winsor, Justin	1893	Woolley, Stephen	C
Winthrop, James	1809	Woolsey, Theodore D.	1871
Winthrop, John	B	Wootten, J. E.	1874
Winthrop, Robert C.	1880	Workman, Benjamin	1785
Winthrop, Thomas L.	1837	Workman, James	1821
Wireman, Henry D.	1837	Wormley, Theodore G.	1878
Wissler, Clark	1924	Worral, James	C
Wistar, Caspar	1737	Worrall, James	1884
Wistar, D.	C	Worthen, Andrew H.	1863
Wistar, Isaac J.	1893	Wright, Arthur W.	1896
Wister, Caspar	1859	Wright, James	A
Wister, Owen	1897	Wurts, Alexander J.	1899
Wister, Owen J.	1866	Wurts, Charles S.	1881
Wistler, Charles J.	1811	Wyckoff, Ambrose B.	1886
Witherspoon, John	1769	Wylie, Samuel B.	1806
Wood, George B.	1829	Wyman, Jeffries	1866
Wood, Horatio C.	1866	Wynkoop, Benjamin	C

Y

Yarnall, Ellis	1880	Young, Charles A.	1874
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Z

Zane, Isaac	C	Zinsser, Hans	1937
Zentmayer, Joseph	1873		

FORMER FOREIGN MEMBERS

Following each name there is a notation of the country of the member as per the following table:

A	Austria	H	Hungary
Ar	Argentina	I	Italy
Au	Australia	Ir	Ireland
B	Belgium	J	Japan
Br	Brazil	M	Mexico
C	Canada	N	Netherlands
Co	Colombia	No	Norway
Cz	Czechoslovakia	P	Portugal
D	Denmark	Po	Poland
E	England	R	Russia
Eg	Egypt	S	Sweden
F	France	Sc	Scotland
Fi	Finland	Sp	Spain
G	Germany	Sw	Switzerland
Gr	Greece	W	West Indies
Gu	Guatemala		

As in the case of former resident members, the date of election is given with the exception of members elected before the union of the two Societies in 1769 (see Brief History of the Society, p. 7). In each such case there is an "A," "B," or "C" according as the member has been a member of both Societies before the union, or a member only of the American Philosophical Society or of the American Society.

This list is as accurate as it was possible to determine at this time. There are a number of question marks and blanks for names. Items in doubt are enclosed in brackets. Further study of the list will be made and anyone who can point out any inaccuracies or supply answers to the questions should do so. The same applies to the list of Former Resident Members.

A

Abrahamson, Joseph N. B. V..D	1829	Adams, John C.E	1848
Acland, Sir Henry	E 1873	Adelung, Friedrich von ...G	1818
Adam, Lucien	F 1886	Adet, Pierre A.F	1796
Adams, Dr.W	1775	Adye, Stephen	E 1772
Adams, Frank D.C	1916	Afzelius, Peter	S 1821

Agardh, Charles A.S	1835	Angiviller, Charles C. Labillarderie d'F	1784
Agassiz, LouisSw	1843	Anmours, Chev. d'F	1783
Airy, Sir George B.E	1879	Archer, Thomas C.Sc	1876
Åkerman, RichardS	1876	Arfwedson, Charles D.S	1853
Alaman, LucasM	1851	Argyll, Duke of. <i>See</i> Campbell, George Douglas	
Albers, Johann A.G	1819	Armstrong, Sir William G. ..E	1874
Albrecht, PaulG	1886	Arrhenius, Svante A.S	1911
Alcantara, PedroP	1876	Arthaud, CharlesW	1789
Allen, Alfred H.E	1898	Augustus Frederick, Duke of SussexE	1832
Anderson, JamesE	1791	Auwers, George F. J. A.G	1912
Anderson, JamesSc	1794	Avebury, 1st Baron. <i>See</i> Lubbock, Sir John	
Andrada e Silva, Jose B. de Br	1822		
Andreani, Paolo, ConteI	1792		
Angelis, Pedro deAr	1840		

B

Baeyer, Adolf vonG	1910	Bertholff, Frederick E. F., Baron de BeelenB	1785
Baker, WilliamE	1787	Bertin, GeorgesF	1895
Balbo, Prospero, ConteI	1831	Berzelius, John J.S	1820
Balfour, Arthur J.E	1917	Bessel, Friedrich W.G	1840
Ball, Sir Robert S.E	1891	Bessemer, Sir HenryE	1894
Banks, Sir JosephE	1787	Bigsby, John J.E	1825
Barbé-Marbois, François, Marquis deF	1780	Billé, SteenD	1832
Barcena, MarianoM	1877	Birch, SamuelE	1869
Barbeau-Dubourg, Jacques ...F	1775	Bischoff, Theodore L. W. ...G	1860
Barclay, RobertE	1787	Blackmore, WilliamE	1869
Barnes, ThomasE	1787	Blackwell, Thomas E.C	1863
Barrande, JoachimA	1862	Blades, WilliamE	1882
Bastian, AdolphG	1886	Blagden, Sir CharlesE	1789
Baumhauer, Eduard H. von..N	1877	Blainville. <i>See</i> Ducrotay de Blainville	
Beattie, JamesSc	1786	Blanchet, FrancisC	1801
Beaufort, FrancisE	1840	Blum, J. ReinhardtG	1882
Beaulieu, Paul L.F	1881	Blumenbach, Johann F.G	1798
Beaumont, Leonce E. deF	1860	Boekh, C. W.N	1870
Becquerel, HenriF	1902	Bohtlingk, Otto vonG	1862
Bedford, PaulW	C	Bonaparte, Charles Lucien, Prince of CaninoI	1824
Bédier, JosephF	1937	Bonaparte, Joseph, Comte de SurvilliersF	1823
Belcher, JonathanC	C	Bonaparte, Lucien, Prince of CaninoI	1823
Bell, Sir LowthianE	1876	Bonaparte, Roland, Prince ..F	1895
Bennett, John H.Sc	1849	Bonifacio, Jose de Andrada e Silva. <i>See</i> Andrada e Silva	
Bergius, PeterS	B	Bopp, FranzG	1863
Bergmann, TorbernS	1773		
Bernard, ClaudeF	1860		
Bernhard, Karl, Duke of Saxe- WeimarG	1830		
Berthelot, MarcelinF	1895		

Borgnis, J. A.I	1820	Brown-Séguard, Charles E. ..F	1854
Bornet, Jean-BaptisteF	1911	Brugsh, HenriG	1869
Bost, JohnF	1864	Brunet, OvideC	1865
Botta, CarloI	1816	Bryce, James, ViscountE	1895
Boucher [de Crèvecoeur] de Perthes, JacquesF	1863	Buchan, Earl of. <i>See</i> Erskine, David S.	
Bragg, Sir William H.E	1940	Budge, E. A. WallisE	1895
Brahm, Fred. F. S. deF	1784	Buffon, Georges L. Leclerc, Comte de.F	B
Braun, Alexander G.G	1862	Bujalsky, ———R	1833
Brayley, Edward W.E	1842	Bunsen, Robert W.G	1862
Brezina, AristidesA	1886	Burmans, Nicolas L.N	1791
Bring, Ebbe S.S	1832	Burmeister, HermannG	1856
Brissot de Warville, Jean P..F	1789	Burrows, Sir GeorgeE	1873
Broca, PaulF	1872	Bustamante, José M.M	1828
Broegger, Waldemar C.No	1899	Butt, John M.W	C
Brongniart, AlexandreF	1819		
Bronn, Henry D.G	1860		

C

Cabanis, Pierre J. G.F	1786	Ceselli, ———I	1869
Cadet-Gassicourt, Louis C. ...F	1787	Chabas, François J.F	1869
Cadet de Vaux, Antoine A. F.F	1787	Charencey, Hyacinthe, Comte deF	1886
Caevallios, PedroSp	1804	Chastellux, François J., Marquis deF	1781
Callisen, Adolph C. P.D	1841	Chevalier, MichelF	1852
Campbell, George D., 8th Duke of ArgyllE	1886	Christison, RobertSc	1841
Camper, Adrien G.N	1806	Clark, Sir JamesE	1845
Camper, PieterN	1789	Cochrane, Archibald, 9th Earl of DundonaldSc	1795
Campomanes, Pedro R., Comte deSp	1784	Coleridge, Sir John D. Coleridge, 1st BaronE	1884
Cancrin, George, ComteR	1843	Collins, William H.C	1932
Candolle, Augustin P. de ..Sw	1841	Collyer, William B.E	1823
Cannizzaro, TommasoI	1885	Condorcet, M. J. A. N. Caritat, Marquis deF	1775
Capellini, GiovanniI	1873	Constant. <i>See</i> Estournelles de Constant	
Carena, GiacintoI	1831	Copland, JamesE	1845
Carleson, Gustaf vonS	1795	Coquebert de Montbret, Charles E., BaronF	1823
Carlier, AugusteF	1869	Cora, GuidoI	1886
Carlisle, NicholasE	1836	Correa de Serra, José F.P	1812
Carpenter, William B.E	1845	Coupigny, André F. deF	1793
Carrillo, Bishop Crescencio..M	1886	Court de Gébelin, Antoine ..F	1783
Casa-Irujo, C. M. Martinez, Marquis deSp	1802	Crèvecoeur, Michel G. St. J. deF	1789
Castiglioni, Luigi, ConteI	1786		
Cauchy, B. AugustinF	1853		
Cavanilles, Antonio J.Sp	1804		
Ceracchi, GuiseppeI	1792		

Coste, Jean F.F	1783	Cumont, Franz V. M.B	1940
Crawford, AdairE	1785	Cruz, FernandoSp	1889
Crell, LorenzG	1786	Cullen, WilliamSc	A
Crelle, August L.G	1853	Cunat, Joanne B.Sp	1796
Crookes, Sir WilliamE	1886	Curie, Marie Sklodowska....F	1910
Crosse, John G.E	1837	Curtius, ErnstG	1895
Crum, Walter E.E	1944	Cuthbert, RossC	1809

D

Dalman, John W.S	1827	Desor, EdouardSw	1862
Dannefeld, C. JuhlinS	1876	Destutt de Tracy, Antoine	
Dantes Pereira, José M.P	1828	L. C., ComteF	1806
Darboux, GastonF	1902	Deveze, JeanF	1796
Darwin, CharlesE	1869	Déville, Henri St. C.F	1860
Darwin, ErasmusE	1792	Dewar, JamesE	1899
Darwin, FrancisE	1909	Dick, Sir AlexanderSc	C
Darwin, George H.E	1898	Diels, HermannG	1909
Dashkov, Ekaterina R.,		Dixon, JeremiahE	C
PrincessR	1789	Dohrn, AntonG	1903
Daubenton, [Louis J. M.?]...F	1775	Dohrn, Karl A.G	1854
Daubeny, Charles G. B.E	1838	Dolland, PeterE	1772
Daubrée, Gabriel A.G	1863	Donner, OttoFi	1886
Davenport, Sir SamuelAu	1876	Dubourg. <i>See</i> Barbeau-Dubourg	
David, Christian G. N.....D	1863	Ducrotay de Blainville,	
Davidson, ThomasE	1866	Henri M.F	1819
Davy, HumphryE	1810	Duhail, Louis E.F	1796
Dawkins, William B.E	1880	Dumas, Jean-BaptisteF	1860
Dawson, Sir John W.C	1862	Duméril, ConstantF	1813
Deabbate, GaspardI	1823	Dümichen, JohannesG	1869
Delage, YvesF	1903	Duncan, AndrewSc	1774
Delambre, Jean B. J.F	1803	Dundonald, Earl of. <i>See</i> Cochrane,	
Delesse, Achille E. O. J.F	1863	Archibald.	
Deleuze, Joseph P. F.F	1817	Duponceau, Jean G.F	1823
Delgada. <i>See</i> Rada y Delgada		duPont, EdouardB	1873
Delitzsch, FriedrichG	1904	du Pont de Nemours, Pierre S.,	
Des Cloizeaux, Alfred L. O. L.F	1878	F	1800
Desmarest, Anselme G.F	1819	Durny, VictorF	1886
Desmoulins, CharlesF	1861	Dworjak, CharlesR	1853

E

Ebers, GeorgeG	1895	Erskine, David S., 11th Earl	
Eddington, Sir Arthur S....E	1931	of BuchanSc	1794
Edwards, BryanW	1774	Eschricht, David [Daniel?] F.D	1863
Ellis, JohnW	1774	Estournelles de Constant, Paul	
Encke, Johann F.G	1839	H. B. B., Baron d'F	1907
Endlicher, StephenA	1842	Evans, Sir Arthur J.E	1913
Engler, AdolphG	1906	Evans, Sir JohnE	1881
		Eyriès, Jean B. B.F	1840

F

Falberg, Samuel	W	1801	Fontana, Felice	I	1783
Famitz, Prof.	I	C	Forbes, George	E	1891
Faraday, Michael	E	1840	Forbes, John	E	1840
Favre, Alphonse	Sw	1888	Forchhammer, Johann G.	D	1862
Fennell, C. A. M.	E	1895	Foronda, Valentin de	Sp	1802
Ferguson, James	E	1770	Forstroem, John E.	W	1807
Ferrer, Joseph J. de	Sp	1801	Foster, George C.	E	1907
Feutry, [Aimé A. J.]	F	1786	Foster, Sir Michael	E	1902
Field, Henry W.	E	1856	Fothergill, Anthony	E	1792
Filsted, Samuel	W	1771	Fothergill, John	E	1770
Fischer, Emil	G	1909	Fox, Robert W.	E	1840
Fischer von Waldheim,			Frank, Johann P.	A	1817
Alexander	G†	1853	Franks, Augustus W.	E	1895
Fischer von Waldheim,			Frauenfeld, George von	A	1869
Gotthelf	G†	1818	Freiré, Cypriano R.	P	1796
Flores, Jos. M. de	Sp	1789	Frerichs, Friedrich T.	G	1862
Flourens, Pierre J. M.	F	1825	Fronde, James A.	E	1862
Flower, William H.	E	1869	Fuss, Nicholas	R	1818

G

Gage, Thomas	E	B	Goeppert, Heinrich R.	G	1862
Galvez, Mariano	Gu	1836	Gonzales, Francisco A.	Sp	1831
Garbier, Thibert	E	1786	Good, John M.	E	1811
Gardiner, Valentine	E	C	Goodsir, John	Sc	1849
Gardoqui, Diego de	Sp	1789	Gougain, Théodore M.	F	1873
Gardoqui, Francis de	Sp	1789	Gräberg af Hemso, Jakob,		
Garnett, Richard	E	1901	Grefve	S	1826
Gasparin, Alphonse,			Granchain [de Sémerville,		
Comte de	F	1864	Comte†]	F	1786
Gastelier, René G.	F	1786	Grandpré, Jacques M.		
Gauss, Karl F.	G	1853	le F. de	F	1796
Gayangos, Pascual de	Sp	1861	Gregorio, Antonio, Marquis		
Gébelin. See Court de Gébelin			de	I	1888
Geikie, Sir Archibald	E	1880	Gregory, Caspar R.	G	1891
Geikie, James	Sc	1876	Grimaldi, Guiseppi C., Marquis		
Gérard de Rayneval, Conrad			de Pietracatella	I	1846
A.	F	1779	Grimm, Jacob	G	1863
Gérôme, J. Léon	F	1895	Grivel, Guillaume	F	1786
Gibbons, Thomas	E	1775	Grosche, John G.	R	1791
Giglioli, Enrico H.	I	1901	Grove, Sir George	E	1895
Gill, Sir David	E	1910	Gruner, Louis	F	1869
Gill, John	Ir	C	Gubernatis, Angelo de	I	1886
Giraldez, Joachim P. C.	P	1827	Guichen, L. U. du Bouexie,		
Gladstone, William E.	E	1881	Comte de	F	1785
Glaisher, James	E	1895	Guillemard, John	E	1797
Glazebrook, Richard T.	E	1895	Guizot, François P. G.	F	1840
Gloucester, Archibald	W	1771	Gutzlaff, Charles	G	1839
Godoy, Manuel, Prince	Sp	1804			

H

Haeckel, Ernst	G 1885	Hochstetter, Ferdinand	
Hahn, John D.	N 1770	von	A 1869
Haidinger, Wilhelm K. von..	A 1855	Hofmann, August W.	G 1862
Haighton, John	E 1810	Holland, Capt.	E 1775
Hakakian Bey, T.	Eg 1869	Holland, Henry	E 1846
Hale, Horatio E.	C 1872	Hooker, Sir Joseph D.	E 1869
Hall, Marshall	E 1853	Hooker, Sir William J.	E 1862
Hamilton, William J.	E 1862	Hopkins, Sir Frederick G.	E 1937
Hammer, Jos. von	A 1817	Hoppancourt, Rousseau d' ..	A 1893
Hamy, Ernst T. J.	F 1891	Hormayr, Joseph, Baron von..	A 1820
Hardy, Godfrey H.	E 1939	Hovelacque, Abel	F 1886
Harvey, William H.	Ir 1860	Huck, Richard	E C
Hauer, Franz von	A 1874	Huggins, Sir William	E 1895
Hawes, William	E 1805	Humboldt, F. H. Alexander,	
Heer, Oswald	Sw 1862	Baron von	G 1804
Helmholtz, Heinrich	G 1873	Humboldt, Wilhelm, Baron	
Henry, Thomas	E 1786	von	G 1822
Hermelin, Samuel G.	S 1785	Hunfalvy, Paul	H 1886
Herschel, Sir John F. W....	E 1854	Hunter, John	E 1787
Herschel, Sir William	E 1785	Hüpsch von Loutzen, J. W. C. A.,	
Hewson, William	E C	Baron	G 1790
Heynitz, Baron de	G 1789	Hutchins, Joseph	W C
Heyse, Paul	G 1895	Huxley, Thomas H.	E 1869
Hilbert, David	G 1932	Hyde de Neufville, Jean G.,	
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		Hyrtl, Joseph	A 1860

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Jahn, Gustav A.	G 1848	Joffre, Joseph J. C.	F 1918
James, Hugh	W 1785	Johannsen, Wilhelm L.	D 1916
Jameneau, Isaac	E C	Johnson, Sir William	E B
Jandennes, Joseph de	Sp 1796	Jomard, Edme F.	F 1829
Janet, Pierre	F 1940	Jones, William	E 1801
Jannet, Claudio	F 1881	Julien, Stanislas	F 1843
Jardine, Sir William	Sc 1845	Jullien [de Paris], Marc A. .	F 1830
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Karpinsky, Alex. P.	R 1897	Keith, Arthur B.	Sc 1935
Kasem Bey, Mirza A.	R 1862	Keller, Frederick	Sw 1863

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Kiepert, Henri	G 1886
Kiernan, Francis	E 1849
King, Charles W.	E 1882
Kirchoff, Gustaf R.	G 1864
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Kitasato, Shibasaburo	J 1914
Klaproth, Heinrich J.	G 1824
Klingstedt, Timothy, Baron de	R 1773
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Kohlrausch, Friedrich W. G.	G 1909
Kolbe, Hermann	G 1874
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Kopp, Hermann	G 1882
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La Forest, Antoine R. C. M., Comte de	F 1792
La Luzerne, Anne C. de ...	F 1780
Lambert, Guillaume	B 1872
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Legge, James	E 1895
Leland, Charles G.	E 1890
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Leopoldo II, Grand Duke of Tuscany	I 1843
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Lewis, Samuel S.	E 1882
Liebig, Justus von	G 1862
Linant Bey	Eg 1869
Lindley, John	E 1862
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Lisboa, José da Silva	Br 1825
Lister, Joseph, 1st Baron ...	E 1897
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